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BI Norwegian Business School – Master Thesis

Credit rating updates as a source of new information in the Scandinavian stock market

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Abstract

This thesis investigates the Scandinavian stock market's response to all credit rating updates on unsecured debt in listed firms given by Standard & Poor's and Moody's during the period 2000 to 2010. We use an event study methodology[1] in order to reveal any relationship between a credit rating update and stock prices in terms of abnormal returns. We find significant abnormal stock returns surrounding negative rating updates, Downgrades and negative Credit Watches. Conversely, we find virtually no significant effects surrounding positive rating updates. These findings are consistent with earlier research in other regions. By defining narrow hypotheses we also find differences in announcement effect dependent on observable contrasting attributes. Finally we conclude that the credit rating agencies do provide the Scandinavian market with new information.

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[1] The event stduy is based on MacKinlay, A.C., 1997. Event Studies in Economics and Finance.

1- Introduction

Credit rating agencies (CRA) have recently attracted attention concerning their role in the financial markets[2]. The designated task of the CRAs is to give an independent analysis of each company's credit quality and debt in order to rank the companies relative to each other[3]. Do the agencies perform this task, and solely this task? Are CRAs messengers or a source of new information for the investor? We want to investigate this subject in the Scandinavian stock market, a relatively small but also liquid market[4]. While the effects of CRAs have been thoroughly examined in markets like the US and UK, few studies have been performed in this field in Scandinavia. Based on earlier research in other regions, we expect credit ratings to have an influence on stock prices. If this is true for the Scandinavian market, we aim to find out to what extent and where the influence will be present. Our main research question is hereby:

> *"How accurate are the credit rating agencies in their evaluation of companies and do they provide the market with new information?".* Further, *"If a rating update affect stock price: is the effect sustainable or only short-term? Do the pre-announcement tools implemented by the credit rating agencies reduce the information asymmetry, and as such, reduce announcement effects? Does debt and/or risk level of issuer affect the magnitude of an announcement effect?"* Finally, *"To which extent does the announcement effect depend on the credit rating agency releasing the rating update?".*

Based on our research questions, we have conducted several analyses and tests using an event study approach by MacKinlay (1997). Our working sample consists of all types of rating updates given by Moody's and Standard & Poor's from 2000 to 2010 and are tested on stock prices from all rated companies listed on the Scandinavian market. We found significant negative abnormal returns associated with negative news, but no significant positive effect related to positive news, which is consistent with previous research. We also found significantly different effects concerning Downgrades, after separating companies with regard

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[2] Becker, B. and Milbourn T., (2011) and Bolton, Freixas and Shapiro, (2012)
[3] See section 3 – The rating process
[4] See table 5.1.1 for comparison of different stock markets.

to level of debt. Further, after testing differences between the two CRAs we found some distinctions under given circumstances. At last, we tested the pre-announcement tools: Outlook and Credit Watches. We found that they do work as intended, as rating updates show no significant effect when preceded by an Outlook or Credit Watch.

Dichev and Piotroski (2001) conclude that there are significant abnormal negative returns following Downgrades. They studied a large database with essentially all of Moody's rating updates in the period 1970-1997 (US). Elayan, Hsu and Meyer (2003) search for announcement effects from credit ratings in New Zealand, a small market with low liquidity. In addition to significant effects surrounding Downgrades, they also found positive effects following Upgrades. This was surprising because the majority of recent research only show significant effects following Downgrades. These results validated the purpose of their research paper, as the intention was to see if effects from credit rating updates differ in dissimilar market types. This purpose is also applicable to our thesis.

Ideally, CRAs should evaluate companies based on all public information in the market. Thus, according to the semi-strong efficient market hypothesis a rating update should not have a significant effect on stock prices, although several research papers suggest otherwise. Earlier research's findings differ together with size of the market tested, liquidity of the market, company's initial credit-quality, methodology and data period. If our results show announcement effects related to credit rating updates, this suggests that the CRAs performs a task that is beyond their designated purpose. This would be interesting for market participants such as brokers, investors and analysts, as it indicates that the credit ratings provide new valuable information to the market. Such additional information could be explained by expertise in the CRAs' analyses and/or unveiling of non-public information.

The CRAs are known to use different methodologies when determining a credit rating. Our thesis will contribute to this issue by studying the potential differences in magnitude of a rating given by Standard & Poor's versus a rating given by Moody's. Additionally, we will perform tests on Affirmations, Confirmations and

Credit Watch updates, not only down- and Upgrades[5]. This gives us a wider set of data to test, and makes it possible to test for a variety of effects. Our study of stock price effects following credit rating updates distinguishes itself from earlier studies with five particular features:

    (i)   Unique data set, with regard to region and time period.

    (ii)   Investigates all types of rating update categories from the CRAs.

    (iii)   Investigates differences in announcement effect between ratings from Standard & Poor's and Moody's.

    (iv)   Investigates whether debt and/or risk level in companies affect magnitude of announcement effect following credit ratings.

    (v)   Investigates if the implementation of the pre-announcement tools Credit Watch and Outlook narrows the information asymmetry gap.

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[5] See table 5.2.2 for a complete list with explanations of the different rating categories.

2- Literature Review

2.1 Literature review

It has been conducted a large amount of research regarding credit ratings and their impact on stock and bond prices. These have mainly been done in the US Market, followed up by studies in countries such as UK, Australia and Japan. The research has investigated the CRAs ability to provide superior analytical skills or possibly reveal non-public information. In this section we will review important studies regarding our topic and accentuate the insights they provide.

Elayan, Maris and Young (1996) declare that there are two common understandings regarding the CRAs role and influence. The first and original view is that the agencies only access public information and is simply an information processer, interpreting the credit quality of companies, without adding any non-public information or expertise in the analyses. The second view directly challenge the first view by implying that the credit ratings reveal the real credit quality, with highly skilled analyses based on information not fully available to the public. Research studies that find no significant abnormal returns around rating announcements supports the first view, but tend to be a rare result in recent research. Studies that find a significant relationship between credit rating updates and stock prices supports the second view, and are the typical result in research performed in the last three decades.

Hsueh and Kidwell (*1988*) state that the value in credit ratings for the issuer is reducing the information asymmetry between issuer and investor. Being rated by two different agencies (i.e. both Moody's and Standard & Poor's) reduces the uncertainty even more. Hence, investors can use credit ratings to learn the credit quality of bonds. *Hsueh and Kidwell* (*1988*) also find that the issuer would be able to reduce its borrowing cost since the value of being rated would excess the cost of obtaining the ratings. The value is created by this sequence of events: Being rated → Reduced information asymmetry → Borrowing costs decreased → cost of capital decreased → More projects accepted → Market value increased. This effect will be static as long as the company *keeps being rated*, continuously maintaining the companies borrowing costs at a lower level than they would be without ratings. The possible stock price effect of a lower borrowing cost will

therefore not be investigated in this thesis; intuitively it will not interfere with our analysis because this "certification effect" appears to be static over time.

Danos, Holt and Imhoff (1984) argue and prove that the CRAs regularly review and investigate the issuer's confidential forecasts for both new and on-going bond issues, and in addition hold expert abilities to evaluate a company's financial situation. This implies that the CRAs are able to provide new information to the market, which in turn could result in announcement effects surrounding credit rating updates.

The general findings in earlier research tend to be that amongst the different rating types, only Downgrades have a statistical significant effect on stock prices. A generally accepted reason for this is that the CRAs are more responsive to negative information, leading to Downgrades, than positive news[6]. Higher responsiveness leads to more accurate timing, and thus Downgrades contains more new information than Upgrades. It is argued that the CRAs are more responsive to negative news because they consider it more important to be in time with a Downgrade than with an Upgrade. This is because a too high rating is thought to be a more serious misjudgement than a too low rating, due to the nature of the consequences. Hypothetically, if a company with a relatively safe rating appears to be unsafe and defaults, the rating agency could be accused of being misleading and inaccurate, and thus indirectly being held responsible for investors' loss. Inversely, if a company is rated worse than reality actually is, it could not lead to a serious event such as a default, and naturally leads to a comparatively lower responsibility for the rating agency.

An older study by Pinches and Singleton *(1978),* performed on data from years 1950-1972, shows no significant reaction in stock prices from rating changes. Intuitively this means that the investors/market have already determined the quality of credit for different companies/bonds, and the credit rating update is in reality a still picture of how the market perceives the financial situation. This also implies that the CRAs in this sample did not have significantly superior analytical skills or private information. This is unlike newer studies, where the majority of

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[6] Altman and Rijken, (2005)

researches show at least some significant effect[7]. Note that this study applied monthly instead of daily data on stock prices, which is not sufficient to capture short-term effects from rating changes.

Griffin and Sanvicente (1982), using monthly data from 1953-1975, find significant abnormal positive returns in the 11 months preceding a rating Upgrade. This implies that the reason for an Upgrade reaches the market before the actual Upgrade, as they did not find abnormal returns post rating. With Downgrades, they found significant effect on stock prices after the announcement. While this study also used monthly data, they criticised the study by Pinches and Singleton (1978) for using inadequate methodology and argue that this might be the reason for the opposing findings. The findings of Griffin and Sanvicente (1982) are comparable to more recent research, in terms of timing theory; the CRAs are timelier when declaring a Downgrade than an Upgrade. Thus, while an Upgrade is being incorporated in the market before the announcement, a Downgrade shows significant post-effect and indicates that the market extracts information from the announcement.

Barron, Clare and Thomas (1997) inspect the effects of ratings and CreditWatch announcements from Standard & Poor's in the UK market using daily data in the period 1984-1992. At the time it was a unique study since it was examining a non-US market. The results replicated the general results from the US studies; they found significant negative effect following Downgrades. Additionally, they found positive abnormal stock price effect from positive CreditWatch additions. This was unexpected based on earlier research, where abnormal returns following a positive announcement have been absent. This finding strengthens the purpose of doing research on this topic in different markets as results may vary.

Gropp and Richards (2001) add that size and direction of the impact from a Downgrade is dependant on the underlying reason for the Downgrade. They investigated European banks in the period 1989-2000. Specifically, they found that rating changes as a result of negative changes in earning outlooks is followed by strong negative abnormal returns, while rating changes caused by an increase in volatility is followed by positive abnormal returns. Gropp and Richards (2001)

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[7] Barron, Clare and Thomas (1997), Gropp and Richards (2001), Dichev and Piotroski (2001) and Elayan, Hsu and Meyer (2003) are examples of later articles that find significant abnormal returns surrounding a credit rating update.

also state that rating agencies perform a valuable role in particular for stockholders, by procuring and summarising non-public information.

Holthausen and Leftwich (1986) find abnormal returns after Downgrades, but also connected to the announcements of additions for Standard & Poor's Credit Watch list, given that the addition indicates either an Upgrade or a Downgrade. These Credit Watch additions also have the ability to build anticipation around a coming rating update, as they are designed to indicate the outcome. Hence, the Credit Watch updates could potentially contain even more information and/or impact the market more than the ratings, as there are no preliminary forecasts preparing the market for a Credit Watch update. The study also investigates the issue of contaminating news surrounding the announcement date; they find approximately the same results in the non-contaminated sample as in the contaminated sample. This implies that it is possible to search for effects following rating updates without filtering out "contaminated" rating updates.

Dichev and Piotroski (2001) study the long-run stock returns following bond-rating changes using an extensive database with essentially all of Moody's rating changes in the US between 1970 and 1997. They prove significant excess returns following Downgrades, with a stronger effect appearing with the small low credit-quality companies. An interesting aspect to note from their research is that the effect found was not necessarily a direct reaction from the Downgrade, but rather occurring in connection with the subsequent earnings announcement. This is actually a sign of underreaction from investors following the credit rating announcement, as the Downgrade actually predicted the negative earnings announcement while investors did not react fully until it took place. Based on Dichev and Piotroski's research, it is sensible to say that a downgrade somewhat predicts that the stock price will fall.

Elayan, Hsu and Meyer (2003) test the effects of credit rating changes in a smaller economy with less liquidity and less analysed markets, and thus a limited level of information. They investigate the financial market in New Zealand, which has a large usage of credit ratings relatively to the market's size, in the period 1990-2000. They find interesting results that contradict studies from US and Australia. In addition to a significant effect from Downgrades and CreditWatch announcements, they also find significant positive effects from rating Upgrades.

This increases the information-provider and analytical role of the CRAs in certain smaller markets. They also find positive significant effect from the announcement of attaining a credit rating itself, leading to an indication of a value-adding effect of being rated by reducing uncertainty surrounding the credit quality of a company (also called the "certification effect"). This study is highly relevant for our thesis, as it has investigated a smaller sized economy. Although the Scandinavian economy differs from New Zealand in a number of aspects, they are both smaller and less researched on this topic than the major international markets.

Bolton, Freixas and Shapiro (2012) investigate several issues concerning conflict of interest for the CRAs. They mainly find that competition amongst CRAs may reduce efficiency, because CRAs may understate credit risk to attract issuers. After all, it is the issuers that are the source of income for CRAs. Additionally, they state that companies allegedly perform "rating shopping", meaning that they tend to not publish unfavourable ratings. As a credit rating is charged only if made public, this suggests an incentive for the CRAs to compete in issuing the "better rating", leading to underestimation of credit risk. A consequence of this phenomenon could naturally become that positive rating updates are less credible than negative rating updates, as positive updates may be seen as a way for the CRA to satisfy the issuer.

2.2 Theoretical Background

In this section we will briefly go through relevant theories related to our thesis in order to explain the existence, or absence, of a relationship between credit rating announcement and stock return reaction.

Market efficiency hypothesis:

Strong market efficiency hypothesis require that all private and public information are incorporated in a given stock price. In reality, excess returns from trading based on private (inside) information is observed, thus this requirement is generally violated. If we find abnormal stock returns related to a credit rating update, it could partly be explained by non-public information being revealed to the CRA by the rated company, indicating that new valuable information are being exposed to the market. If this is the case, the market is said to be semi-strong efficient (potentially weak form).

Assuming the market is semi-strong efficient, the announcement effect from credit ratings can possibly be explained by three hypotheses: 1) the information content hypothesis, 2) the wealth redistribution hypothesis and 3) the signalling hypothesis.

1. *The information content hypothesis*

   Zaima, J.K. and McCarthy, J., (1988) suggest that there is information asymmetry between the credit rating agency and the market resulting in valuable information being disclosed during a credit rating update. Information gathering is costly and it is obvious that the CRAs benefit from an economy of scale and therefore gather the information more efficiently. In turn this leads to a greater availability of information not fully disclosed to the public. This statement is challenged by another research paper by Holthausen and Leftwich (1986), which state that CRAs do not monitor companies closely and that a credit rating update is rather dependent on changes in debt structure.

2. *The wealth redistribution hypothesis*

   This hypothesis suggests that there is a conflict of interest between shareholders and bondholders. For instance, if a bond is downgraded due to an increase in risk because of higher leverage and the market anticipates this, then the outstanding value of the bond will fall and some of this value (wealth) will be transferred to the stockholders. Based on this hypothesis Goh and Ederington (1993) argues that a Downgrade is not always bad news for stockholders.

3. *The signalling hypothesis*

   The signalling hypothesis is based on the view that an updated credit rating should signal assumptions regarding future earnings and cash flows. Dependent on the reason for an update, it should reflect the outlook for the rated company or for the whole industry. This hypothesis expects the same outcome as the information content hypothesis, that an Upgrade (Downgrade) is followed by a positive (negative) reaction in the stock price.

3- The rating process

CRAs' intended task is to gather information with regard to a company's creditworthiness and judge their ability to pay their debt. This is accomplished by collecting and summarising public information, performing in-depth analyses, and possibly assessing private information provided by the issuer. For the issuer, the value added by attaining and publishing a credit rating lies in the reduction of information asymmetry between the issuer and potential investors and creditors.

Out of the lot, Standard & Poor's and Moody's are the main participants in the credit rating industry, with global coverage of companies for several decades. They are also the only rating agencies with significant market coverage in Scandinavia; thus, it was natural to choose Standard & Poor's and Moody's when selecting rating agencies to investigate for the purpose of our thesis.

Comparing Standard & Poor's and Moody's, the objectives of their credit ratings have some important differences that should be taken into account. Standard & Poor's credit ratings solely indicate the probability of default of the rated company. Moody's, on the other hand, has a more complex approach when rating a company, as they in fact rate not only the probability of default, but rather the expected loss; "expected loss is a function of the probability of default and the expected severity of loss given a default"[8]. While Moody's investigate and include how severe the losses given a default would be when giving a rating, Standard & Poor's only concern is the net risk of default.

Standard & Poor's emphasise the importance of transparency in their work, and publish a detailed "instruction manual" on how they conduct their rating process for each particular industry sector. Ratings are based on a balanced weighing between qualitative and quantitative analyses. They find it important that market participants understand how and why they assign particular credit ratings. Moody's are more reserved concerning their criteria and methodology in the rating process, and state that "...we believe that any attempt to reduce credit rating to a formulaic methodology would be misleading and would lead to serious mistakes". Moody's only publish general framework for their rating process,

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[8] Moody's Investors Service, 2012.

which may lead to greater uncertainty surrounding their rating updates. This is interesting for us in our thesis as we can test for differences in market reaction dependent on whether a rating is published by Standard & Poor's or Moody's.

Besides Downgrades and Upgrades, which are well known due to media coverage, there is a considerable amount of other information being communicated through the CRAs. In particular, these are Confirmations, Affirmations, Credit Watch updates and Outlook additions. Confirmation is a rating that confirms the last credit rating given and keeps it unchanged. An Affirmation is not a rating, but purely the credit rating agency affirming that the rated company's credit quality has not changed since the last rating. Normally, ratings and Affirmations are supplied with an Outlook, which is a general hint on the future course of a rating. If a company/rating is placed on positive or negative Credit Watch, it means that a rating is under review, and the credit rating agency informs the market of the expected direction. As these credit update categories potentially could contain just as much information as Downgrades and Upgrades, we have chosen to include them in our analyses.

The issuers are the main source of income for the CRAs, potentially raising a conflict of interest that may damage the integrity of the agencies. Implicitly, it is easy to believe that ratings historically are tweaked in a positive direction to attract issuers. But in turn, too good ratings could cause reduced credibility of the agencies for users, and would also appear on comparisons of historical default rates and credit ratings. However, this conflict of interest may explain announcement effects found in our investigations.

4- Hypotheses

In this section we present our eight hypotheses that will be used to investigate our research question. By using these hypotheses in our tests, and possibly rejecting their respective null hypotheses, we will be able to analyse and draw conclusions regarding our topic.

4.1 Announcement effect surrounding credit ratings

Hypothesis 1: *Downgrades, negative Credit Watches and negative Affirmations have a negative impact on stock returns.*

Hypothesis 2: *Upgrades, positive Credit Watches and positive Affirmations have a positive impact on stock returns.*

Hypothesis 3: *Confirmations (Moody's only) and New ratings have an impact on stock returns.*

In our first three hypotheses we examine every type of update that CRAs are providing the market with and how the market responds to different updates. These are the fundamental tests of our thesis, which will be used to draw conclusions regarding the presence of announcement effects from credit ratings. Also, these tests will show us which rating update categories that are interesting to test in our remaining hypotheses.

4.2 Standard & Poor's versus Moody's and Low versus High debt and risk level

Hypothesis 4: *The market's reaction from a credit rating update differs in magnitude dependent on whether the rating update is given by Moody's or Standard & Poor's.*

The objective of our fourth hypothesis is to uncover any preferences the Scandinavian market may have towards one of the two CRAs. We will measure if the impact from the different credit rating updates on stock prices differs dependent on whether the information comes from Moody's or Standard & Poor's. The different methodologies and level of transparency in rating criteria in the two agencies could explain a rejection of the null hypothesis.

Hypothesis 5: *The impact on stock prices from a credit rating update is dependent on whether companies' capital structure consists of high or low debt.*

With our fifth hypothesis we will learn if the level of debt affects the magnitude of an announcement effect following a rating update. We will examine if the announcement effect from a credit rating update is significantly different between companies with high and low debt level. We use the debt-to-equity ratio in order to distinguish companies, and define companies with debt-to-equity ratio in excess of 1 as a company with high debt. This is tested because a credit rating is in reality a rating of the ability for a company to pay their debt, thus, a company with higher debt could potentially be more sensible to rating changes.

Hypothesis 6: *The impact on stock prices from a credit rating update is dependent on whether the companies have a high or low level of risk (beta).*

The objective of hypothesis six is to uncover any differences between companies with high and low risk level. We will use the correlation between companies' return and the return on the market, beta value, calculated from the market model in our estimation window[9] as a measure of risk. We include the one-third highest and lowest beta values in the different rating categories in order to distinguish companies with high and low risk level. We believe that companies with high risk are more sensitive to rating changes due to potentially higher volatility in the stock returns.

4.3 Market anticipation and sustainability of a credit rating update 'effect'

Hypothesis 7: *The effect from Upgrades and Downgrades with previous corresponding Outlook/Credit Watch is anticipated by the market and will have no impact on stock prices.*

With this hypothesis we will test if anticipated rating updates have smaller impact on stock prices. This test will clarify if Credit Watches and Outlook additions are successful pre-announcement tools in reducing the information asymmetry by increasing the flow of communication to the market participants. This will be tested by examining for announcement effects surrounding Upgrades and Downgrades with a preceding Outlook or Credit Watch.

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[9] See section 5.4 – Methodology, for explanations

Hypothesis 8: *The announcement effects from credit rating updates are not temporary and will be sustained over time.*

We examine how the market responds to the announcement and measure the possible effect from the credit rating updates over time. If we find significant effects from the credit ratings surrounding the announcement date, but the effect fades away during the upcoming days, we can say that the CRA's provide non-sustainable information to the market. It can also be partly explained by the market over- or underreacting to the information provided by the CRA's.

5- Data and Methodology

5.1 Data description

Our data consist of credit rating updates from Standard & Poor's and Moody's in addition to stock prices from the Scandinavian stock market. Our original sample consists of 430 credit rating updates, which include all the different categories of credit rating updates that Moody's and Standard & Poor's apply. These ratings originate from 49 different companies in Scandinavia that are listed during our sample period[10]; our sample period is from January 2000 through December 2010.

The type of debt used in our sample is long term unsecured, which is consistent with what earlier research papers on this topic have used. The main reason for using long-term unsecured debt is that the majority of corporate market debt consists of long-term bond issues, and unsecured debt has the least complicated structure compared to convertible and other similar debt. Also due to availability, unsecured debt is the most commonly rated debt type, which enables us to collect a sufficient amount of data.

We chose to collect daily stock returns[11] in order to focus on a narrow window around the rating update and capture the potential short-term effect. We are aware that the use of daily data raises the possibility of additional noise in the data series[12], but are dependent on daily data to distinguish announcement effect surrounding the day of a rating update.

Table 5.1.1

Stock Exchange	Turnover rate (%)												Market Cap
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average	USD Bn.
NYSE	88	94	105	99	105	113	118	123	138	129	98	**110**	**13394**
NASDAQ	201	201	203	123	127	129	183	217	404	349	189	**211**	**3889**
LSE	67	79	95	102	141	142	124	270	227	146	102	**136**	**3613**
HKEX	61	47	42	42	51	44	48	81	123	65	59	**60**	**2711**
OMX Stockholm	107	134	122	124	134	124	147	139	152	119	95	**127**	**629**
OSEBX	97	86	75	98	110	129	154	153	157	132	125	**120**	**298**
OMX Copenhagen	51	55	69	58	68	92	88	89	83	81	62	**72**	**238**
NZEX	46	46	38	38	40	40	45	47	88	40	35	**46**	**36**

Sources: NYSE Homepage, The World Bank Homepage, Hong Kong Exchange Homepage, NASDAQ Nordic Homepage, Oslo Stock Exchange Homepage

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[10] We have included literally all companies in the Scandinavian market that have received a rating from Moody's or Standard & Poor's during our sample period.
[11] Same as *Griffin and Sanvicente, 1982,* and also the majority of later papers.
[12] *Glascock, Davidson and Young, 1987*

When comparing the leading stock exchanges of the world with the Scandinavian market, we see from table 5.1.1 that the Scandinavian stock exchanges are substantially smaller sized in terms of market capitalisation. They are similar (apart from Copenhagen, which only accounts for a fifth of the total market cap in the Scandinavian stock market) in terms of liquidity (turnover rate). Assuming that asymmetrical information increases with low liquidity, there is no particular reason to expect that the level of asymmetrical information in Scandinavia should be higher than in the leading stock exchanges. We see that the stock exchange in New Zealand is smaller in size and has a lower level of liquidity than both the leading exchanges and the Scandinavian market.

5.2 Data collection

We have collected all available credit rating updates for companies listed on Scandinavian stock exchanges during our time sample. To acquire ratings from Moody's, we matched a list of all publicly traded companies in the Scandinavian stock market with Moody's public database of ratings. Standard & Poor's do not provide a public database of historical ratings like Moody's, but by contacting Standard & Poor's directly we were able to specify and purchase the rating history for our sample period. The distribution of rating updates categorised by country, rating agency and rating type are shown in the table below:

Table 5.2.1

Distribution of credit ratings

Country	Agency	Downgrades	Upgrades	Credit Watches	Affirmation	Confirmation	New	Total
Sweden	Moody's	20	13	17	21	10	2	176
	S&P	24	13	13	33	0	10	-
Norway	Moody's	19	12	15	20	9	9	166
	S&P	26	13	18	22	0	3	-
Denmark	Moody's	16	9	21	2	8	8	88
	S&P	8	6	3	5	0	2	-
Total		113	66	87	103	27	34	430

Summary statistic of the orignial sample of 430 rating updates over the period January 2000 to January 2010.

From table 5.2.1 we can see that the distribution of observations between Sweden and Norway are fairly equal, while the amount of observations from Denmark is lower. The number of observations from the two CRAs is about the same; Moody's account for 54% and Standard & Poor's 46%.

Allocation of the different rating types is rather uneven. The most common rating update is Downgrade, as 26 % of our observations are Downgrades, followed by 24% Affirmations (with different Outlooks) and 15% Upgrades. Negative and

positive Credit Watches sums up to 16% and 5% respectively. New ratings account for 8%, while Confirmations (only Moody's) account for 6%. Below is a table describing the different types of rating updates that we have included in our thesis[13].

Table 5.2.2

Credit rating	Main update from CRA. In-depth evaluation of credit worthiness. A scale of letter designations describes the credit quality of a company. Based on thorough analysis over time.
Downgrade	CRA lowers the credit rating of a company, stating a lower level of credit worthiness.
Upgrade	CRA raises the credit rating of a company, stating a higher level of credit worthiness.
Confirmation	CRA confirms the credit rating of a company, stating an unchanged level of credit worthiness.
New rating	CRA releases a credit rating on an unrated company, stating the level of credit worthiness.
Credit Watch	A temporary release announcing that the CRA is contemplating a revised credit rating in a particular direction. Can be an instant response to news. Always followed by a credit rating within the next 8 weeks.
Negative	CRA informing the market that a Downgrade is being considered. Often used when bad news about the issuer is released.
Positive	CRA informing the market that an Upgrade is being considered. Often used when good news about the issuer is released.
Affirmation	CRA updating the market that a rating is maintained, through a press release concerning the company but not necessarily explicitly about the rating. Lowest rank of information communicated by CRAs.
Negative Outlook	An Affirmation with a negative Outlook expresses that the rating is sustained but believed to trend in a negative manner.
Positive Outlook	An Affirmation with a positive Outlook expresses that the rating is sustained but believed to trend in a positive manner.

Sources: Moody's and Standard & Poor's

Thomson Reuters Datastream, our source for stock prices, provides us with time series of stock prices for the relevant companies during our time period adjusted for contaminating capital actions. Market indices for Denmark and Sweden, Copenhagen KFMX and OMX Stockholm respectively, are also collected from Datastream. The Norwegian OSEBX market data are collected directly from the Oslo Stock Exchange.

5.3 Data selection

Rating data from Standard & Poor's and Moody's are crosschecked against Factiva's news database in order to confirm the publication dates of the ratings.

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[13] A complete list of all the 430 ratings is presented in appendix 5.2.

With the exception of seven observations we could confirm the date of all the ratings. The unconfirmed seven observations are deleted from our working sample.

From the original data sample of 430 rating updates we had to delete 33 observations due to missing stock prices and/or market prices within our estimation window for the given dates. 26 credit ratings regarding banks were also removed from our working sample because of clustering. This clustering is due to overall refined rating methodology by Moody's; leading to sector-wide rating changes.

5.4 Methodology

The methodology and notation that we use follows the article *Event Studies in Economics and Finance (1997) by A. Craig MacKinlay*. We have, however, made a few modifications regarding the notations in order to make it more appropriate for our thesis.

Returns will be indexed in event time using notation τ, where $\tau = 0$ is defined as the event date. $\tau = T_1 + 1$ to $\tau = T_2$ represent the initial event window and $\tau = T_0$ to $\tau = T_1$ constitutes the estimation window. The estimation- and initial event window can be written as $L_1 = T_1 - T_0$ and $L_2 = T_2 - T_1$. The additional event windows are defined in the area between $T_1 \: and \: T_3$. The timing sequence of different windows is illustrated below in Figure 5.4.1.

Figure 5.4.1. MacKinlay (1997)
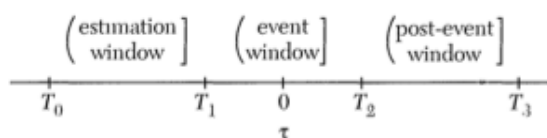
With aim of measuring the announcement effect from the different rating updates on stock prices we will calculate the abnormal return from our sample, both short- and long-term. We define the abnormal return (AR), as a return that deviates from the otherwise normal return of the stock[14], which is calculated by applying the market model. Further, we will use the prediction errors from the market model to

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[14] *Barron, Clare and Thomas, 1997*

calculate the potential abnormal returns. We will estimate the market model parameters based on an estimation window of 200 days from $\tau = -210$ to $\tau = -11$, where $\tau = 0$ is defined as the day of a rating announcement.

To study the potential short- and long-term effects on stock prices from the announcement of credit rating updates we will define several event windows. We will explore a two-day window, $\tau = 0$ and $\tau = +1$, in order to measure if there is an initial stock price response following a rating announcement. The date $\tau + 1$ will be included due to possible press release after the opening hours of the stock exchange.

Next, we will construct a pre-announcement window from $\tau = -10$ to $\tau = -1$ in order to draw conclusions about the development of the companies returns prior to an announcement. Further, we will look at the potential short-term effect where the event window is defined from $\tau = 0$ to $\tau = 5$ and long term effect with an event window from $\tau = 0$ to $\tau = 45$. With help from the two last event windows we will examine if the possible effect on stock prices are sustainable (i.e. the effect on returns increase/decrease to a given level and stays there), or if the stock price is corrected back to its initial level.

Market model:
Griffin and Sanvicente (1982) applies different methodologies in order to calculate normal returns; the two-factor model, portfolio method and the market model. The constant mean return model, capital asset pricing model and multifactor normal performance models based on arbitrage pricing theory have also been commonly used in event studies over the years. However, none of these models have turned out to have any significant advantage to the market model, which is why we have decided to apply this model.

$$R_{i\tau} = \alpha_i + \beta_i R_{m\tau} + \varepsilon_{i\tau} \qquad (1)$$

$$E(\varepsilon_{i\tau} = 0) \qquad \text{var}(\varepsilon_{i\tau}) = \sigma_\varepsilon^2$$

$$R_{i\tau} = \ln \left(\frac{Stock\ price_t}{Stock\ price_{t-1}}\right) \quad \text{and} \quad R_{m\tau} = \ln \left(\frac{Market\ Index_t}{Market\ Index_{t-1}}\right)$$

Where $R_{i,\tau}$ is the continuously compounded return on stock "i" given time "τ", $R_{m,\tau}$ is the continuously compounded market return for the given markets, alpha the intercept and beta the correlation between return on stock "i" and the market return. Under general conditions ordinary least squares (OLS) is a consistent estimation procedure for the market model parameters[15] and we assume that the residual term satisfy the assumptions regarding the OLS regression model.

$$AR_{i\tau} = R_{i\tau} - \widehat{\alpha}_\iota - \widehat{\beta}_\iota R_{m\tau} \tag{2}$$

Where

$$\widehat{\beta}_\iota = \frac{\sum_{\tau=T_0+1}^{T_1}(R_{i\tau} - \hat{\mu}_i)(R_{m\tau} - \hat{\mu}_m)}{\sum_{\tau=T_0+1}^{T_1}(R_{m\tau} - \hat{\mu}_m)^2}$$

$$\widehat{\alpha}_\iota = \hat{\mu}_i - \widehat{\beta}_\iota \hat{\mu}_m$$

$$\widehat{\sigma^2_{\varepsilon_\iota}} = \frac{1}{L_1 - 2} \sum_{\tau=T_0+1}^{T_1} (R_{i\tau} - \widehat{\alpha}_\iota - \widehat{\beta}_\iota R_{m\tau})^2$$

and

$$\hat{\mu}_i = \frac{1}{L_1} \sum_{\tau=T_0+1}^{T_1} R_{i\tau}$$

$$\hat{\mu}_m = \frac{1}{L_1} \sum_{\tau=T_0+1}^{T_1} R_{m\tau}$$

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[15] MacKinlay 1997

Where $\tau = T_1 + 1, ..., T_2$, is the sample of abnormal returns for company "*i*" in the initial event window, the same applies when calculating the additional event windows, but with a different time sample. We obtain the estimates $\hat{\alpha}$ and $\hat{\beta}$ by running OLS regressions on the market model over our estimation period.

Conditional on the event window's market return, under the null-hypothesis the abnormal return is normally distributed with a zero conditional mean and conditional variance equal to:

$$\sigma^2(\text{AR}_{i\tau}) = \sigma_{\varepsilon_i}^2 + \frac{1}{L_1}\left[1 + \frac{(R_{m\tau} - \hat{\mu}_m)^2}{\widehat{\sigma_m^2}}\right] \tag{3}$$

From equation (3) above the first component is the disturbance variance: $\sigma_{\varepsilon_i}^2$ and the second element is the additional variance due to sampling error in α_i and β_i. This sampling error leads to serial correlation of the abnormal returns even though the true disturbances are independent through time. Having a long estimation window, which makes the second term approach zero, solves this problem. Given our estimation window of 200 days we can reasonably assume that the asymptotically approximations holds, and the variance of AR is consequently

$$\sigma^2(\text{AR}_{i\tau}) = \sigma_{\varepsilon_i}^2 \tag{4}$$

Since we use daily observation of stock prices and therefore can calculate abnormal returns on a daily basis, it is possible to summarise the AR across different companies, resulting in the cumulative abnormal return:

$$\text{CAR}_{i(\tau_1,\tau_2)} = \sum_{\tau=\tau_1}^{\tau_2} \text{AR}_{i\tau} \tag{5}$$

Where "τ_1" represent the first and "τ_2" the last day of the event window, conditional upon that $\tau = 0$ is the date of the announcement.

Asymptotically (as L_1 increases) the variance of $\text{CAR}_{i(\tau_1,\tau_2)}$ is:

$$\sigma_i^2(\tau_1, \tau_2) = (\tau_2 - \tau_1 + 1)\sigma_\varepsilon^2 \tag{6}$$

Next, we average the CAR in any sample (e.g. Upgrades only) to form an average prediction of the cumulative abnormal return.

$$ACAR_{i(\tau_1,\tau_2)} = \frac{1}{N}\sum_{i=1}^{N} CAR_{i(\tau_1,\tau_2)} \tag{7}$$

N is the number of observations in the sample.

The variance of ACAR is calculated using the sample variance measure of σ_ε^2 from the market model regression in the estimation window:

$$Var\left(ACAR_{i(\tau_1,\tau_2)}\right) = \frac{1}{N^2}\sum_{i=1}^{N}\sigma_i^2(\tau_1, \tau_2) \tag{8}$$

The ACAR is then tested over various sub-periods (short and long-term) for statistical significance using a parametric test, as proposed in the literature rely on the essential assumption that individual company's abnormal return is normally distributed. If the abnormal returns are indeed normal, independent, and identically distributed, the test statistic follows a student t-distribution[16], which is consistent with the choice of data.

The test statistic is

$$\theta = \frac{ACAR_{i(\tau_1,\tau_2)}}{Var(ACAR_{(\tau_1,\tau_2)})^{1/2}} \sim N(0,1) \tag{9}$$

And the distributional result is asymptotic with respect to the number of securities N and the length of the estimation window.

This setup of an event study corresponds to A. Craig MacKinlay (1997), and the selection of estimation- and event windows are also motivated by previous research.

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[16] Barron, M.J.; Clare, A.D. and Thomas, S.H., 1997

6- Results

In this section we will go through our tests and their results, which are based on an event study approach described in the previous section. The hypotheses are presented chronologically and the results are discussed respectively[17].

6.1 Announcement effect surrounding credit ratings

In order to make a conclusion about our first three hypotheses we conduct t-tests to examine whether the average cumulative abnormal returns (ACAR) are different from zero surrounding the rating updates. One-tailed tests are performed on the credit rating updates that are predictable in which direction it affects stock returns, while two-tailed tests are conducted on credit rating updates where the outcome is less predictable. One-tailed tests are performed on Upgrades, positive Credit Watches and positive Affirmations to test whether ACAR is greater than zero, while Downgrades, negative Credit Watches and negative Affirmations are tested for ACAR less than zero. The two-tailed tests are conducted on the rating types Confirmation and New rating.

Hypothesis 1: *Downgrades, negative Credit Watches and negative Affirmations have a negative impact on stock returns.*

Figure 6.1.1

Figure 6.1.1 presents the development of average cumulative abnormal returns (ACAR) for Downgrades, negative Credit Watches and Affirmations with negative Outlook. ACAR is plotted over a 21 days period where t=0 is the announcement day.

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[17] A thorough analysis and conclusion of our hypotheses are presented in the next section.

As shown in figure 6.1.1, the ACAR from Downgrades seems to vary randomly before and after the rating update while a sharp decline is observed at the date of the announcement. The decline is sustained over the 10 following days.

ACAR for Negative Credit Watches is less severe than for Downgrades. It varies fairly randomly during the period but shows a clear decline starting at an earlier point compared to Downgrades.

The abnormal returns surrounding negative Affirmations do not have a clear pattern. There is a slight decrease in CAR preceding the rating update, followed by an unstable increase in the following 10 days.

Table 6.1.1

Average CAR measures

	Downgrades			Credit Watches Negative			Affirmations Negative		
Window	ACAR	test-statistic	p-value	ACAR	test-statistic	p-value	ACAR	test-statistic	p-value
-10 to -1	-0,0154 *	-1,3000	0,0984	-0,0208 **	-2,1341	0,0192	-0,0123	-1,0694	0,1454
0 to +1	-0,0193 ***	-3,6431	0,0002	-0,0126 ***	-2,8881	0,0030	-0,0043	-0,8390	0,2030
0 to + 5	-0,0223 ***	-2,4232	0,0087	-0,0115 *	-1,5168	0,0682	0,0051	0,5764	0,2837
# of observations	92			46			44		

Presentation of the tests conducted on downgrades, negative credit wathces and affirmations with negative outlook. We test if the average cumulative abnormal returns(ACAR)
are significantly less than zero over our three event windows.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

The least surprising, but nonetheless relevant results from table 6.1.1 are the Downgrades, which have proven to be significantly negative in the majority of previous papers. The ACAR for Downgrades is significant at a 99% confidence level for the initial (t=0 to t=+1) and short-term (t=0 to t=+5) event window, while the pre-event (t=-10 to t=-1) window is significant at a 90 % level. The initial event window contains a remarkable negative effect on stock prices of 1.93% ACAR over the two days.

Negative Credit Watch updates affect stock returns more than Downgrades in the preceding days to an announcement and is significant at a 95 % confidence level. The initial event window is significant at a 99 % confidence level with an ACAR of −1.26 %.

Negative Affirmations, in contrast, do not have any significant effect on stock prices, as implied in table 6.1.1. The signs are as predicted negative in the first

two event windows. However the short-term window show a positive, although not significant, effect on stock prices.

These results indicate that Downgrades and negative Credit Watches have negative impact on stock prices surrounding the credit rating updates, while negative Affirmations demonstrate no significant announcement effect.

Hypothesis 2: *Upgrades, positive Credit Watches and positive Affirmations have a positive impact on stock returns.*
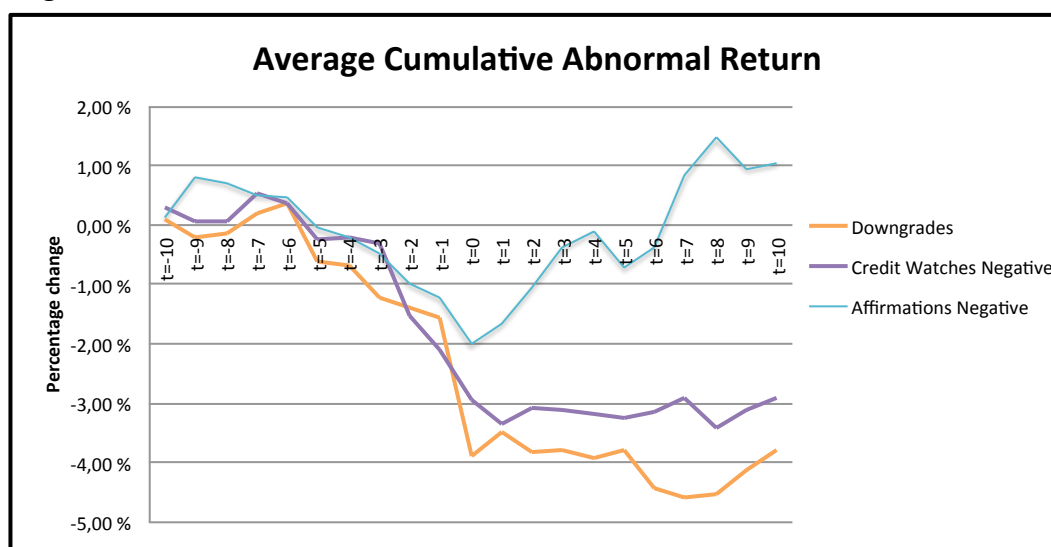
Figure 6.1.2
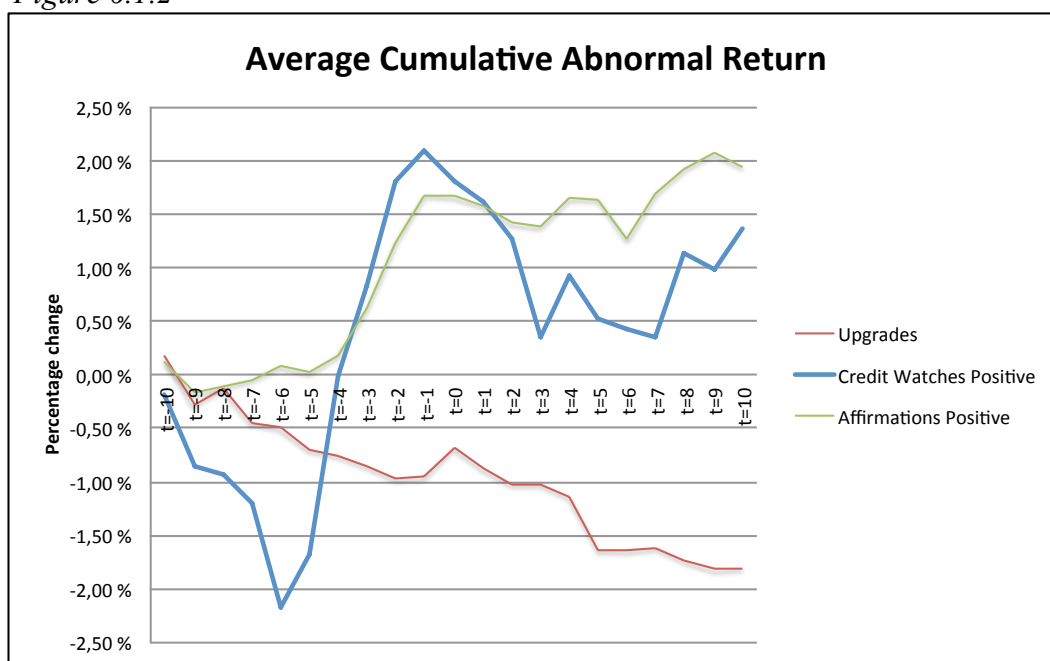
Figure 6.1.2 presents the development of average cumulative abnormal returns (ACAR) for Upgrades, positive Credit Watches and Affirmations with positive Outlook. ACAR is plotted over a 21 days period where t=0 is the announcement day.

The development of ACAR regarding Upgrades is not in favour of our alternative hypothesis. The ACAR shows a clear negative drift starting at eight days prior to the rating update and continues to fall during the sample period, with a minor positive shift the day before announcement.

Positive Credit Watch also has a marginally positive trend surrounding the rating update. However, the majority of the effect appears prior to the rating update, thus similar to Affirmations with positive Outlook.

Affirmations with positive Outlook have a positive development in ACAR compared to Upgrades. However, the ACAR seems to take effect four days prior to the rating update and stabilize after the announcement.

Table 6.1.2

Average CAR measures

	Upgrades				Credit Watches Positive				Affirmations Positive			
Window	ACAR		test-statistic	p-value	ACAR	test-statistic	p-value		ACAR		test-statistic	p-value
-10 to -1	-0,0095	*	-1,3441	0,0925	0,0208	1,2715	0,1121		0,0168	*	1,6063	0,0639
0 to +1	0,0008		0,2444	0,4039	-0,0048	-0,6496	0,2632		-0,0010		-0,2089	0,4186
0 to + 5	-0,0068		-1,2415	0,1101	-0,0157	-1,2351	0,1186		-0,0004		-0,0491	0,4807
# of observations	51				15				17			

Presentation of the tests conducted on upgrades, positive credit wathces and affirmations with positive outlook. We test if the average cumulative abnormal returns(ACAR)
are significantly greater than zero over our three event windows.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

The results from our tests regarding Upgrades, positive Credit Watch and Affirmation with positive Outlook are presented in table 6.1.2. According to the test we see that Upgrades only have a significant impact on stock prices in our pre-announcement window. However, the effect is negative, which was not the predicted direction of this rating category.

Positive Credit Watches and positive Affirmations have a negative impact on stock prices after the rating update, although not significant. Affirmation with a positive Outlook is the only rating update (of these three), which have any significant positive impact on stock prices and this effect occurs prior to the announcement.

Hypothesis 3: *Confirmations (Moody's only) and New ratings have an impact on stock returns.*

Since we do not have any obvious predictions of how the rating updates New rating and Confirmation could affect stock prices, we perform a two-tailed t-test. We test to see if ACAR is different from zero surrounding the announcement day.

Figure 6.1.3

Average Cumulative Abnormal Return
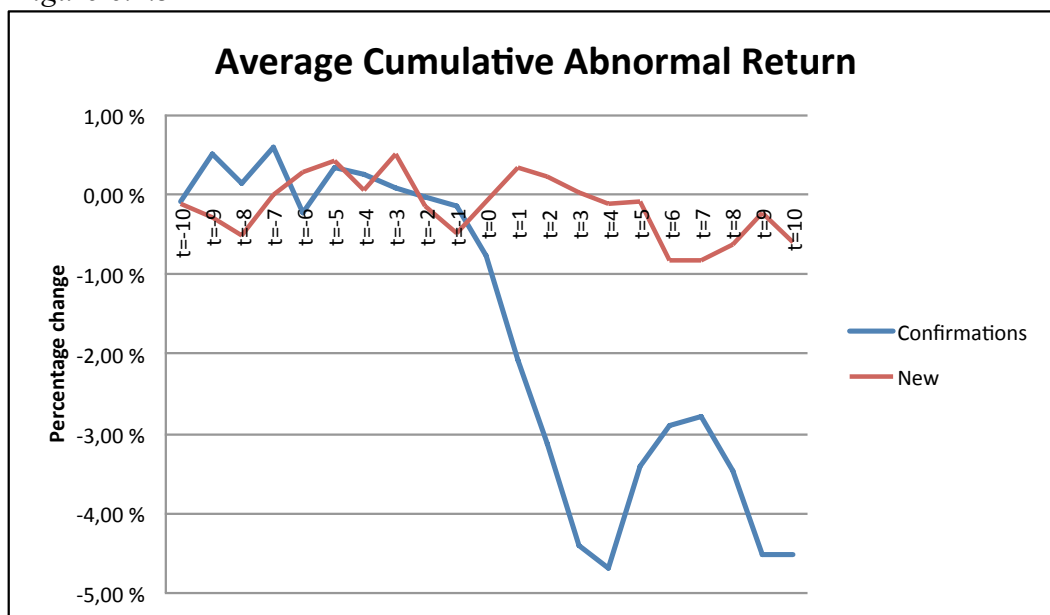
Figure 6.1.3 presents the development of average cumulative abnormal returns (ACAR) for Confirmations and New ratings. ACAR is plotted over a 21 days period where t=0 is the announcement day.

We see that there is no particular announcement effect surrounding New ratings. Abnormal returns are keeping a stable level through the whole period. In contrast, Confirmations show a negative shift in abnormal returns starting at t=-1.

Table 6.1.3.

Average CAR measures

Window	New			Confirmations			
	ACAR	test-statistic	p-value	ACAR		test-statistic	p-value
-10 to -1	-0,0049	-0,4008	0,6917	-0,0016		-0,0986	0,9225
0 to +1	0,0082	1,5072	0,1434	-0,0193	**	-2,7191	0,0136
0 to + 5	0,0040	0,4250	0,6742	-0,0326	**	-2,6502	0,0158
# of observations	*28*			*20*			

Presentation of the tests conducted on new and confirmations rating updates. We test if the average cumulative abnormal returns(ACAR) are significantly different from zero over our three event windows.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

Table 6.1.3 shows that there is no significant effect surrounding New ratings, as expected from the figure. With Confirmations we find a significant negative effect at the 95% confidence level following the rating update in both the initial event window and the short-term event window.

6.2 Standard & Poor's versus Moody's and Low versus High debt and risk level

Our second set of hypotheses seeks to find divergence in announcement effect if we split rating updates by attributes. We split events into rating updates by Moody's/Standard & Poor's, on companies with low/high debt-to-equity ratio and

by companies with low/high risk level.

In order to test the hypotheses about different attributes, we divide our sample into two sub-groups and test for differences in the means. We apply an independent two-sample t-test, which have three slightly different approaches based on sub-sample size and variance. We take this into account by conducting F-tests of equality of variances[18] in order to conclude which of the three tests to apply. In cases of unequal sample size and variances the test is also known as a Welch's t-test.

Due to shortage of data in some of the rating categories, we have decided to set the limit to at least 15 rating updates after dividing the categories into sub-samples. Hence, only Downgrades, Upgrades and negative Credit Watches are included in the forthcoming tests in order to get reliable and powerful results.

Hypothesis 4: *The market's reaction from a credit rating update differs in magnitude dependent on whether the rating update is given by Moody's or Standard & Poor's.*

The test statistic is $ACAR_M$ (Moody's) minus $ACAR_{S\&P}$ (Standard and Poor's) over the specified event windows. If this test-statistic is significantly different from zero in any of the event windows, then we can assume that the market react stronger towards one of the CRAs.

Table 6.2.1.

Test for difference in mean

	Downgrades			Upgrades				Credit Watches Negative		
Window	$ACAR_M - ACAR_{S\&P}$	test-statistic	p-value	$ACAR_M - ACAR_{S\&P}$		test-statistic	p-value	$ACAR_M - ACAR_{S\&P}$	test-statistic	p-value
-10 to -1	-0,0037	-0,3429	0,3662	-0,0162		-1,1768	0,1225	-0,0045	-0,1660	0,4345
0 to +1	-0,0063	0,4613	0,3230	-0,0107	*	-1,5048	0,0694	-0,0130	-0,6893	0,2471
0 to +5	-0,0319	-0,3009	0,3821	-0,0025		-0,2495	0,4020	-0,0039	-0,1865	0,4265
# of observations	Moody's:36 S&P:56			Moody's:20 S&P:31				Moody's:23 S&P:23		

Presentation of the tests conducted on downgrades, upgrades and negative credit wathces. We test if the average cumulative abnormal returns(ACAR)
differ significantly between Moody's and S&P.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

Table 6.2.1 shows us the test for differences in means between Moody's and Standard & Poor's in three rating update categories: Downgrades, Upgrades and negative Credit Watches. The difference in means on Downgrades and negative Credit Watches are small and insignificant, which indicate that the market does

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[18] See appendix 6.2 for calculation and conclusion regarding the F-test.

not have any preferences between the two CRA regarding negative rating updates. On the contrary, we find significant result regarding Upgrades in the initial event window. The result implies that the market initially react more positively to Upgrades when it is released by Standard & Poor's instead of Moody's.

Figure 6.2.1
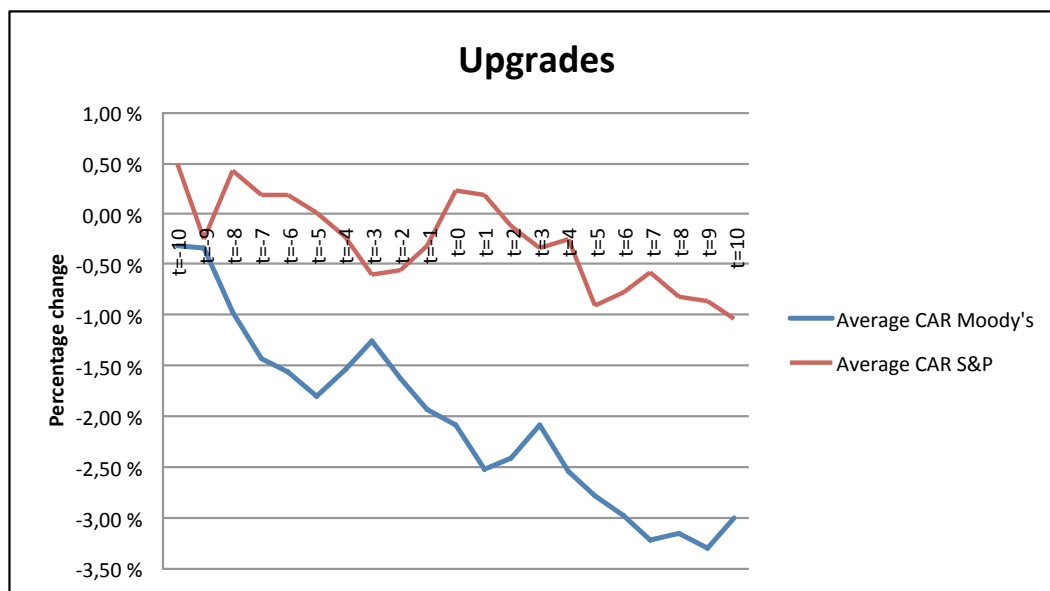
Figure 6.2.1 presents the development of average cumulative abnormal returns (ACAR) for Upgrades between Moody's and Standard & Poor's. ACAR is plotted over a 21 days period where t=0 is the announcement day.

Figure 6.2.1 present the ACAR surrounding Upgrades from Moody's and Standard & Poor's. We see that stock returns are slightly increasing when Standard & Poor's releases updates, while decreasing when announced by Moody's, explaining the significant initial event window[19].

Hypothesis 5: *The impact on stock prices from a credit rating update is dependent on whether companies' capital structure consists of high or low debt.*

The test-statistic for this hypothesis is ($ACAR_{High} - ACAR_{Low}$), which is defined based on whether the tested companies have high or low debt-to-equity ratio. As mentioned earlier, high debt to equity ratio is associated with companies that have a debt-to-equity ratio in excess of 1.

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[19] Graphs of ACAR for Downgrades and negative Credit Watches between Moody's and Standard & Poor's can be found in appendix 6.2.D.

Table 6.2.2.

Test for difference in mean

Window	Downgrades $ACAR_{High} - ACAR_{Low}$		test-statistic	p-value	Upgrades $ACAR_{High} - ACAR_{Low}$	test-statistic	p-value	Credit Watches Negative $ACAR_{High} - ACAR_{Low}$	test-statistic	p-value
-10 to -1	-0,0294		-0,8709	0,1937	-0,0092	-0,5815	0,2819	-0,0068	-0,2520	0,4011
0 to +1	-0,0611	**	-1,9682	0,0277	-0,0052	-0,5123	0,3079	0,0042	0,2344	0,4081
0 to + 5	-0,0806	**	-2,1745	0,0174	0,0058	0,4443	0,3312	-0,0278	-1,3002	0,1002
# of observations	D/E>1:42 D/E<:48				D/E>1:13 D/E<:35			D/E>1:20 D/E<:25		

Presentation of the tests conducted on downgrades, upgrades and negative credit wathces. We test if the average cumulative abnormal returns(ACAR)
differ significantly between companies with high and low debt.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

From table 6.2.2 we see that the initial and short-term event windows are significant at a 95 % confidence level when measuring the differences in announcement effect between companies with high and low debt during a Downgrade. Hence, for companies that have a capital structure dominated by debt, Downgrades have significantly more impact on stock returns.

On the contrary, for Upgrades and negative Credit Watches we find no significant differences related to debt structure. [20]

Hypothesis 6: *The impact on stock prices from a credit rating update is dependent on whether the companies have a high or low level of risk (beta).*

The test-statistic is equal to the previous hypothesis: $(ACAR_{High} - ACAR_{Low})$, where $ACAR_{High}$ contains ratings with the one-third highest beta values and $ACAR_{Low}$ the one-third lowest beta values, within the different rating categories.

Table 6.2.3.

Test for difference in mean

Window	Downgrades $ACAR_{High} - ACAR_{Low}$		test-statistic	p-value	Upgrades $ACAR_{High} - ACAR_{Low}$	test-statistic	p-value	Credit Watches Negative $ACAR_{High} - ACAR_{Low}$	test-statistic	p-value
-10 to -1	0,0048		0,1123	0,4555	-0,0062	-0,3889	0,3500	-0,0334	-0,8705	0,1957
0 to +1	-0,0427		-1,0677	0,1468	0,0019	0,2442	0,4043	0,0334	1,2375	0,1131
0 to + 5	-0,0690	*	-0,0690	0,0793	0,0088	0,7980	0,2154	0,0327	1,1226	0,1356
# of observations	High Beta:31 Low Beta:31				High Beta:17 Low Beta:17			High Beta:15 Low Beta:15		

Presentation of the tests conducted on downgrades, upgrades and negative credit wathces. We test if the average cumulative abnormal returns(ACAR)
differ significantly between companies with high and low risk.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

Table 6.2.3 present the results after testing for differences between high and low beta values in the three different rating categories. As shown, we see that high vs. low risk is only significantly different with respect to Downgrades and only in the short-term event window.

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[20] Graphs of comparison between companies with high and low debt with respect to developing ACAR's are presented in appendix 6.2.E.

6.3 Market anticipation and sustainability of a credit rating update 'effect'

In this section we will present our results regarding the impact of the pre-announcement tools: Outlook and Credit Watch. Also, we will present our findings concerning sustainability of announcement effects using a longer event window.

Hypothesis 7: *The effect from Upgrades and Downgrades with previous corresponding Outlook/Credit Watch is anticipated by the market and will have no impact on stock prices.*

First we divide our original sample into two sub-samples[21] dependent on whether the market has received any information regarding an upcoming Upgrade or Downgrade. The sub-samples are allocated based on two factors: Previous Outlook and previous Credit Watch preceding the Downgrade/Upgrade. Further, we test if the ACAR is different from zero in the sub-groups using a one-tailed test.

Table 6.3.1

Average CAR measures

	Downgrades Previous Negative Outlook			Downgrades Previous Negative Credit Watch			
Window	ACAR	test-statistic	p-value	ACAR		test-statistic	p-value
-10 to -1	-0,0233	-1,0989	0,1394	-0,0024		-0,1651	0,4350
0 to +1	0,0006	0,0666	0,4736	-0,0311	***	-4,8833	0,0000
0 to + 5	0,0083	0,5041	0,3085	-0,0484	***	-4,3811	0,0001
# of observations	39			30			

Presentation of the tests conducted on negative outlook and negative credit watch. We test if the average cumulative abnormal returns(ACAR) are significantly less than zero over our three event windows.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

First, we test the effect from Downgrades. As presented in table 6.3.1 we see that our results regarding the market's anticipation is fragmented. Downgrades with previous negative Outlook are not significant in any of our event windows. On the contrary, Downgrades with previous negative Credit Watch have significant effects on stock prices in both our initial and short-term window with a confidence level of 99%. This suggests that the market is more surprised by a Downgrade when it follows a negative Credit Watch than an Outlook addition.

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[21] Appendix 6.3.1 contains figures showing development of average AR and ACAR for the different sub-samples.

Table 6.3.2.

Average CAR measures

	Upgrades Previous Positive Outlook				Upgrades Previous Positive Credit Watch			
Window	ACAR		test-statistic	p-value	ACAR		test-statistic	p-value
-10 to -1	-0,0261	**	-2,0196	0,0355	-0,0279	**	-2,2233	0,0240
0 to +1	-0,0101	*	-1,7560	0,0548	0,0038		0,6825	0,2545
0 to + 5	-0,0117		-1,1654	0,1355	-0,0118		-1,2106	0,1257
# of observations	11				12			

Presentation of the tests conducted on negative outlook and negative credit watch. We test if the average cumulative abnormal returns(ACAR)
are significantly less than zero over our three event windows.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

Regarding Upgrades, ratings with previous positive Outlook are the only initial event window that is significant. However this rating have a negative impact on stock prices and consequently do not support our alternative hypothesis. The same applies for the two pre-announcement windows that are significant.

Hypothesis 8: *The announcement effects from credit rating updates are not temporary and will be sustained over time.*

To test whether the effect is sustainable over time we include a new event window, which is defined from t=0 to t=45[22]. The idea behind this long-term event window is to test whether ACAR is significantly larger than zero for positive rating updates and less than zero for negative rating updates over the entire event window. Hence, the effect does not fade out during the long-term window. If the test of ACAR in the long-term event window is insignificant, we can assume that the effect has withdrawn back to its origin, thus not sustainable.

In this test we have only included rating update categories where we have found significant effects in the predicted direction during the initial event window. This is obvious because it is necessary to have an initial effect to test whether the effect is sustainable or not.

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[22] Presented in section 5.4 – Methodology.

Figure 6.3.2

Average Cumulative Abnormal Return
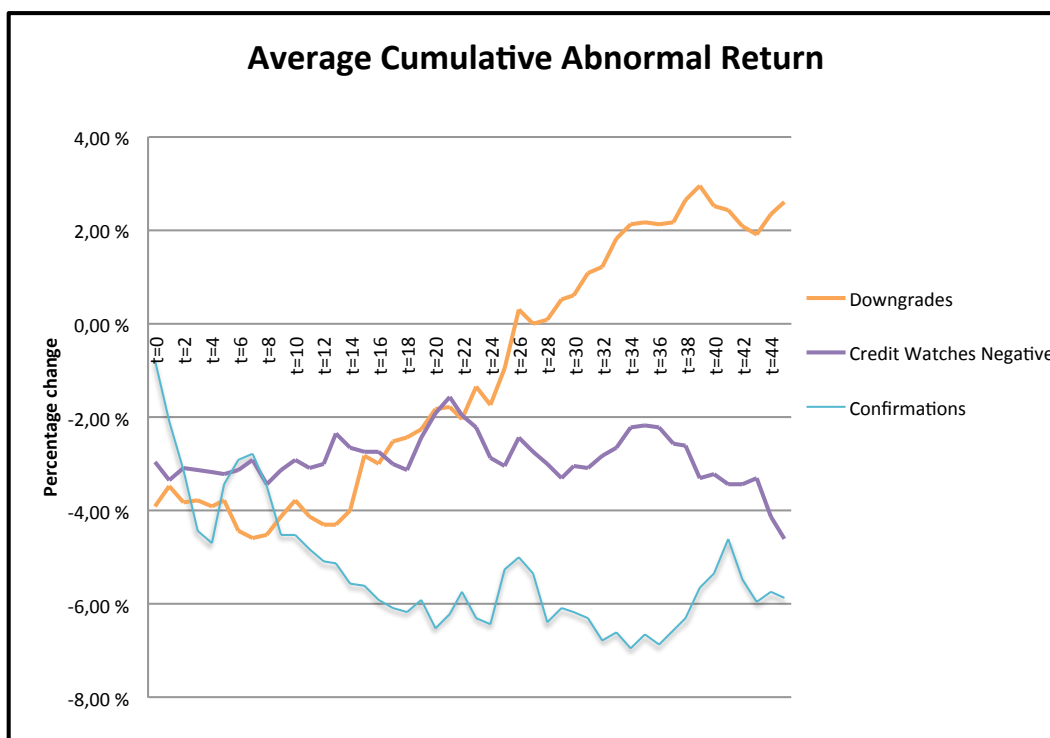
Figure 6.3.2 presents the development of average cumulative abnormal returns (ACAR) for Downgrades, negative Credit Watches and Confirmations. ACAR is plotted over a 46 days period where t=0 is the announcement day.

In the long-term event window for Downgrades we see that the ACAR does not change much after the rating update until t=13, but then have a positive drift ending up correcting the effect and more so. Hence, the effect on Downgrades does not appear to be sustainable.

The effect from negative Credit Watches is sustained after the rating update and appears to be relatively stable through the whole event window.

ACAR for Confirmations in the long-term event window seems to have a slightly negative drift, with little volatility. This implies that the negative effect following Confirmations is sustainable.

Table 6.3.3.

Average CAR measures

	Downgrades			Negative Credit Watches			Confirmations (Moody's)		
Window	ACAR	test-statistic	p-value	ACAR	test-statistic	p-value	ACAR	test-statistic	p-value
0 to + 45	0,0414 *	1,6250	0,0538	-0,0251	-1,1996	0,1183	-0,0571 *	-1,6780	0,0549
# of observations	*92*			*46*			*20*		

Presentation of the tests conducted on downgrades, negative credit wathces and confirmations. We test if the average cumulative abnormal returns(ACAR) are significantly less than zero in our long-term event window.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

Table 6.3.3 present the test whether ACAR is less than zero for Downgrades, negative Credit Watches and Confirmations in the long-term event window. The results from the tests are that only Confirmation has a sustainable negative effect on stock returns over the event window. Downgrades are also significant, but in the opposite direction, hence has a positive significant drift over the 45 days after a rating update.

7- Robustness analysis

7.1 Robustness

In this section we will study the robustness of our data. The tests conducted are based on the assumptions that returns are independently and normally distributed. A robustness analysis will reveal both strengths and weaknesses of our data and tests. After searching for outliers we eliminated four observations, all being downgrades, due to contaminating events[23]. Further, tests including downgrades were conducted excluding these observations.

In the case of low number of observations, daily stock returns usually deviate considerably from normality. However, according to The Central Limit Theorem, the sample mean asymptotically converge to a normal distribution. In addition, Brown & Warner (1985) concludes that non-normality of daily returns does not have any obvious impact on event study methodologies.

Another concern related to our methodology and data is that event studies in general suffers from a problem of distinguishing the effect from the tested events when using share price data. However, we have no reason to believe that our data suffer from these problems more than papers relating to our topic. Appendix 7.1 presents plots of the distribution of our CAR for different rating updates during a 21 day window starting from t=-10 to t=10.

7.2 Outliers

Based on the plots presented in figure 7.2.1 we have reason to believe that there are notable outliers in our Downgrades sample. Hence, to make our result more robust we want to test for extreme values in our data.

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[23] See section 7.2. Outliers

Figure 7.2.1: distribution of CAR plots.
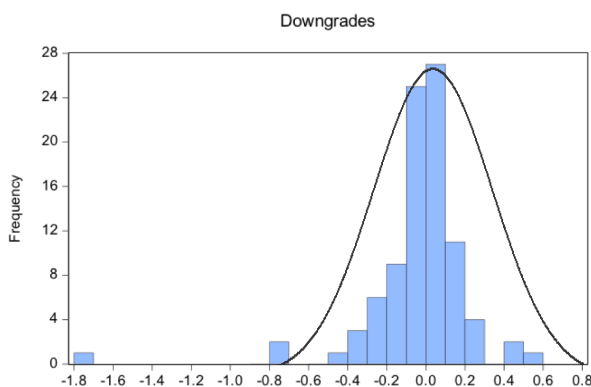
In order to identify outliers we organise ACAR by size including the ten days before a rating update and ten days after. Further, we calculate critical values for eliminating extreme values by taking the 10th and 90th percentile and multiplying them with five[24]. If any of the original values exceeds the critical values, we search the Factiva database in order to detect if there are any contaminating news on the given dates. The test resulted in identifying 4 contaminating news for Downgrades[25]. The extreme values in the data are then set to zero, hence do not affect our new results in the forthcoming tests.

7.3 Re-testing Downgrades after elimination of contaminating news.

Hypothesis 1: *Downgrades have a negative impact on stock returns.[26]*

Table 7.3.1.

Average CAR measures

Window	Downgrades ACAR		test-statistic	p-value
-10 to -1	0,0010		0,0863	0,4657
0 to +1	-0,0085	*	-1,5942	0,0572
0 to + 5	-0,0088		-0,9575	0,1704
# of observations	92			

Presentation of the tests conducted on downgrades after elimination
of contaminating news. We test if the average cumulative abnormal returns
(ACAR) are significantly less than zero over our three event windows.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

Table 7.3.1 present the one-tailed test on Downgrades after taken into account outliers (contaminating news). As expected, the result is less significant than the original sample including the extreme values. However, the initial event window is still significant at a 90 % confidence level.

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[24] Table of the critical values is presented in appendix 7.2
[25] See appendix 7.3
[26] Hypothesis 1, only including downgrades

Hypothesis 4: *The market's reaction from Downgrades is dependent on whether the rating update comes from Moody's or Standard & Poor's.*[27]

Table 7.3.2.

Test for difference in mean

| Window | Downgrades | | | |
	$ACAR_M - ACAR_{S\&P}$		test-statistic	p-value
-10 to -1	-0,0037		-0,1595	0,4368
0 to +1	-0,0063		-0,4601	0,3233
0 to + 5	-0,0319	*	-1,4651	0,0742
# of observations	Moody's:36 S&P:56			

Presentation of the test conducted on downgrades after elimination of contaminating news.
We test if the average cumulative abnormal returns(ACAR) differ significantly between Moody's and S&P.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

Differences between Moody's and Standard & Poor's after correcting for contaminating news are changed considering Downgrades. The original result did not conclude with any significant differences, however, after the correction we see from table 7.3.2 that our short-term event window is significant at a 90 % confidence level.

Hypothesis 5: *The impact on stock prices from a Downgrade is dependent on whether the companies' capital structure consists of high or low debt.*[28]

Table 7.3.3.

Test for difference in mean

| Window | Downgrades | | | |
	$ACAR_{High} - ACAR_{Low}$		test-statistic	p-value
-10 to -1	0,0067		0,2918	0,3856
0 to +1	-0,0373	***	-2,7487	0,0040
0 to + 5	-0,0511	***	-2,5464	0,0067
# of observations	D/E>1:42 D/E<:48			

Presentation of the test conducted on downgrades after elimination of contaminating news.
We test if the average cumulative abnormal returns(ACAR) differ significantly between companies
with high and low debt.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

The result after correcting for contaminating news considering differences between companies with high and low debt level is even more significant in the two latter event windows. The p-values are decreasing from 0,027 and 0,0174 in the initial and short-term event windows to 0,004 and 0,0067, as shown in table 7.3.3.

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[27] Hypothesis 4, only including downgrades
[28] Hypothesis 5, only including downgrades

Hypothesis 6: *The impact on stock prices from a Downgrade is dependent on whether the companies have a high or low level of risk (beta).*[29]

Table 7.3.4.

Test for difference in mean

Window	Downgrades		test-statistic	p-value
	$ACAR_{High} - ACAR_{Low}$			
-10 to -1	-0,0441	*	-1,6514	0,0519
0 to +1	-0,0057		-0,4171	0,3391
0 to + 5	-0,0242		-1,0276	0,1541
# of observations	High Beta:31 Low Beta:31			

Presentation of the test conducted on downgrades after elimination of contaminating news. We test if the average
cumulative abnormal returns(ACAR) differ significantly between companies with high and low beta values.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

Table 7.3.4 present differences in ACAR, regarding Downgrades, between companies with high and low risk after taking into account contaminating news. Our new result shows significantly differences between the two categories in the pre-announcement window, but not the short-term window that we found significant before the correction of contaminating news.

Hypothesis 7: *The effect from Downgrades with previous corresponding Outlook/Credit Watch is anticipated by the market and will have no impact on stock prices.*[30]

Table 7.3.5.

Average CAR measures

Window	Downgrades Previous Negative Outlook			Downgrades Previous Negative Credit Watch		
	ACAR	test-statistic	p-value	ACAR	test-statistic	p-value
-10 to -1	0,0155	0,7346	0,2335	-0,0024	-0,1651	0,4350
0 to +1	0,0006	0,0666	0,4736	0,0022	0,3443	0,3666
0 to + 5	0,0083	0,5041	0,3085	-0,0071	-0,6415	0,2631
# of observations	39			30		

Presentation of the tests conducted on downgrades with no outlook, negative outlook and negative credit watch after elimination of contaminating news.
We test if the average cumulative abnormal returns(ACAR) are significantly less than zero over our three event windows.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

Table 7.3.5 present Downgrades followed by a negative Outlook or Credit Watch after correction of contaminating news. The new result shows that none of the event windows are significant, in contrast to the result including the contaminating news where both the initial and short-term event windows in Downgrades preceded by a negative Credit Watch were significant.

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[29] Hypothesis 6, only including downgrades
[30] Hypothesis 7, only including downgrades

Hypothesis 8: *The announcement effect surrounding Downgrades are not temporary and will be sustained over time.*[31]

Table 7.3.6.

Average CAR measures

Downgrades				
Window	ACAR		test-statistic	p-value
0 to + 45	0,0548	**	2,1544	0,0169
# of observations	92			

Presentation of the test conducted on downgrades after elimination of contaminating news. We test if the
average cumulative abnormal returns(ACAR) are significantly less than zero in our long-term event window.
*** Significant at a 99% confidence level
** Significant at a 95% confidence level
* Significant at a 90% confidence level

Table 7.3.6 shows that the elimination of contaminating news has made the long-term event window more significant, although still in the opposite direction of what we tested for. The positive drift over the 45 days has changed from having a p-value of 0,0538 to 0,0169.

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[31] Hypothesis 8, only including downgrades

8- Analysis of results and Conclusion

This section will be used to interpret and analyse our results. We will state whether our hypotheses are rejected or not, as well as explaining possible reasons for our results. At last we will make a conclusion on to what degree credit ratings influence and provide new information to the Scandinavian stock market.

8.1 Announcement effect surrounding rating updates

In this part we have investigated if there is a relationship between credit rating updates and stock prices. All types of credit rating updates are tested, and the results vary.

***Hypothesis 1:** Downgrades, negative Credit Watches and negative Affirmations have a negative impact on stock returns.*

We can partly reject the null hypothesis. Before correcting for contaminating news we found strong negative effects significant at the 99% confidence level surrounding both Downgrades and negative Credit Watch updates. There were no significant abnormal returns surrounding Affirmations with negative Outlook. After correcting for contaminating news, Downgrades are still significant, however, only in the initial window at the 90% confidence level.

***Hypothesis 2:** Upgrades, positive Credit Watches and positive Affirmations have a positive impact on stock returns.*

We cannot reject the null hypothesis. There are some effects found surrounding Upgrades and Affirmations with positive Outlook, although only in our pre-announcement window. The effect found preceding Upgrades is not in the predicted direction, making the significance unsupportive of our alternative hypothesis.

***Hypothesis 3**: Confirmations (Moody's only) and New ratings have an impact on stock returns.*

We can partly reject the null hypothesis. We found significant negative effect with Confirmations starting on rating day; this effect is significant at the 95% confidence level. There was no effect surrounding New ratings.

In these fundamental tests we found results similar to earlier research from other regions. There are significant negative effects surrounding negative news, while there are no significant positive effects surrounding positive news. Based on our literature review and theoretical background, we will explain why this is the typical results, and also our results. A combination of *the information content hypothesis* and *timing theory* is what our explanation is based on. As stated in theoretical background, assuming that the market efficiency is not stronger than semi-strong efficient, *information content hypothesis*[32] could explain announcement effects. This hypothesis states that it is appropriate to assume information asymmetry between the market and the CRAs. The CRAs benefit from an economy of scale and additionally have access to non-public information. Announcement effects surrounding rating updates could therefore be explained by private information being unveiled. An important issue to address after claiming this explanation is the differences particularly between positive and negative news. More specifically, why are there only significant effects surrounding negative news? As described in our literature review, timing[33] could explain just this. CRAs seem to show a higher responsiveness to negative news, due to the consequences of a too high rating being more severe than a too low rating. Another explanation is that the rated companies have higher incentives to communicate positive news to the market, hence the asymmetry between the market and companies concerning positive news are small. On the contrary, the negative news is held back by the companies and revealed by the rating agencies, making the announcement effect from negative news more severe.

Regarding the significant negative returns following Confirmations, it is not easy to draw any immediate explanations on why this effect is present. *Information content hypothesis* and *timing theory* is not applicable as it was with negative news, as we do not have a predicted direction with Confirmations. One potential explanation could be that the market expects an Upgrade preceding the majority of the Confirmations included in this data set, leading to disappointment in the market when the Upgrade does not come.

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[32] Zaima, J.K. and McCarthy, J., 1988
[33] Altman and Rijken, 2005

As we did not find any significant effects surrounding New ratings (companies not rated earlier), our tests are not able to confirm the claimed "certification effect"[34]. However, it is reason to believe that this effect would have surfaced earlier, more specifically when the news about attaining a rating was made public. We have not tested for abnormal stock price effects surrounding these events, and can therefore not draw any conclusions regarding "certification effects" in the Scandinavian market. Still, it is sensible to believe that it exists based on earlier research.

8.2 Standard & Poor's versus Moody's and Low versus High debt level

Hypothesis 4: *The market's reaction from a credit rating update differs in magnitude dependent on whether the rating update is given by Moody's or Standard & Poor's.*

As presented in table 6.2.1[35], only Upgrades are significantly different comparing Moody's and Standard & Poor's before eliminating contaminating news. We found a slightly positive initial reaction surrounding Upgrades from Standard & Poor's, while the initial effect from Moody's is negative.

After elimination of contaminating news, Downgrades appear to be significant in the short-term event window. The difference in ACAR over the 6 days window is -3,19%. The test-statistic is $ACAR_{Moody's}$ - $ACAR_{S\&P}$, hence it seems that the market react more to Downgrades from Moody's during the short-term event window. As a result we can partly reject our null hypothesis and claim that there is a difference in how the market reacts, given the credit rating agency.

Based on the differences between Moody's and Standard & Poor's, explained in section 3: *The rating process*, we had reason to believe that the outcome of the test would be significant. Standard & Poor's has a well-defined and descriptive process of how they rate a company, while Moody's approach is concealed and commonly thought of as a "black box". Our tests conclude that the market react stronger to Downgrades given by Moody's, and additionally react negatively to Upgrades. This confirms our hypothesis and supports the assumption that higher secrecy in methodology by Moody's increases the information asymmetry with

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[34] Hsueh and Kidwell, 1988 and Elayan, Hus and Meyer (2003)
[35] Test of hypothesis 4

the market. This makes the announcement effect surrounding ratings from Moody's greater and also less predictable.

Hypothesis 5: *The impact on stock prices from a credit rating update is dependent on whether companies' capital structure consists of high or low debt.*

From the different ratings that are tested, after divided into sub-groups based on level of debt, only Downgrades appears to be affected by high debt-to-equity ratio. With p-values in the initial and short-term event windows of 0,027 and 0,017 before eliminating contaminating news and 0,004 and 0,0067 after, we can conclude that companies with capital structure dominated by debt are more sensitive to Downgrades compared to companies with less debt. Even though the rating agencies take into account the level of debt when conducting their ratings, the market seems to emphasize this in a higher degree when it comes to Downgrades.

Based on the significant results regarding Downgrades, our conclusion is that we partly reject the null hypothesis stating that the impact from credit ratings is independent of the companies' capital structure. This is interesting as the level of debt is highly observable i.e. for an investor, and thus, this finding could be used as a tool to take precautions when trying to predict a stock price reaction from a rating update.

Hypothesis 6: *The impact on stock prices from a credit rating update is dependent on whether the companies have a high or low level of risk (beta).*

We cannot reject the null hypothesis, however there are some results worth mentioning. Before correcting for contaminating news the short-term event window showed significant effect with a p-value of 0,079, while after correcting for contaminating news the only significance was found in the pre-announcement window with a p-value of 0,052. We conclude that the level of risk, beta, only affects the impact on stock prices from Downgrades prior to a rating update, hence, do not have any impact on the announcement effect on stock prices *following* a rating update. Beta is therefore not to be regarded as an amplifying factor when predicting the announcement effect following a credit update.

8.3 Market anticipation and sustainability of a credit rating update 'effect'

Findings regarding impact on announcement effect given use of pre-announcement tools are presented in this part. Also, we will present findings on the sustainability of credit ratings, studied using a longer event window.

Hypothesis 7: *The effect from Upgrades and Downgrades with previous corresponding Outlook/Credit Watch is anticipated by the market and will have no impact on stock prices.*

The pre-announcement tools Outlook and Credit Watch are used to narrow the information asymmetry between the CRAs and the market. We tested both Downgrades and Upgrades divided with respect to the use of pre-announcement tools. Before elimination of contaminating news we found highly significant effects surrounding Downgrades following a negative Credit Watch, contradicting with our hypothesis. After the robustness analysis where we eliminate ratings with contaminating news, this significance withdraws. Also, with Upgrades, there are no significant positive effects surrounding the credit ratings when pre-announcement tools are used to warn the market. Our results support our hypothesis making us able to reject the null hypothesis.

This result shows that the implementation of pre-announcement tools have been successful for the CRAs, narrowing the asymmetry gap between them and the market participants. In contrast, as earlier stated[36], when not dividing with respect to pre-announcement tools, significant announcement effects surround Downgrades.

Hypothesis 8: *The announcement effects from credit rating updates are not temporary and will be sustained over time.*

We can partly reject the null hypothesis. Amongst the three rating categories we investigated in this test, Confirmations are the single category where we found a significant (negative) effect throughout our long-term event window. It is not easy to retrieve any particular insights regarding the sustainability of Confirmations's announcement effect. This effect did not have an initial predicted direction due to the nature of the update; thus, the only reasonable explanation for this effect is

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[36] See Hypothesis 1

that in most cases where a Confirmation is issued, the market was expecting an Upgrade.

Negative Credit Watches is arguably sustainable even though it has no significant effect in the long-term event window; this is due to the fact that a substantial part of the stock price effect appears before the announcement day, not impacting the test (t=0 - t=45). Hence, when it shows no significance in the long-term window this means that the stock price remains at the level it was lowered to pre announcement. On the other hand, Downgrades showed no sustainable effect after the announcement, rather the opposite, as the long-term effect following Downgrades are positive (correcting the short-term negative effect). The short non-sustainable effect following Downgrades could be considered an overreaction from the market.

Negative Credit Watches being sustainable in the long term while Downgrades are not is supporting our earlier finding[37] that the pre-announcement tools work. It would seem that the market incorporates new sustainable information in the stock price after a negative Credit Watch, while not after a Downgrade. This implies that the negative Credit Watch in many cases prepares the market for a potential Downgrade, which in turn is its purpose.

8.4 Concluding remarks

In terms of results, our thesis replicate earlier research papers to a certain extent. We mainly found abnormal returns in stock prices surrounding negative updates from CRAs, specifically Downgrades and negative Credit Watch updates. With regards to positive rating updates, we found no positive abnormal returns. We have presented two theories to explain these results, a combination of higher information asymmetry between the issuer and market concerning negative news, and the timing theory.

We also defined some specialised hypotheses with the purpose of finding interesting results showing differences in announcement effects based on observable contrasting attributes. By doing this we were able to find and present results adding something new to the literature, particularly for our choice of region. Firstly, we found that the market responds differently to rating updates

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[37] See Hypothesis 7

depending on whether Moody's or Standard & Poor's publishes it. We wanted to test this based on the known differences in the CRAs transparency of methodology and the methodology itself. Further, companies dominated by debt were found to be more sensitive to Downgrades after comparing companies with high and low level of debt. Finally, we found that use of the pre-announcement tools Credit Watch and Outlook narrows the information asymmetry between the issuers and the market, and as such, the implementation of these tools can be seen as successful.

After conducting our tests and analyses we can confirm that CRAs provide new information to the market, as there is existence of announcement effects surrounding particular credit rating updates. At last, by using observable attributes of the companies rated we argue that it is possible to predict to some extent the market's reaction of certain rating updates.

9- Limitations and suggestions for further research

In our research we have sought to supply a broad understanding of how the different types of credit rating updates affect the Scandinavian stock market. A great deal of research has been conducted on the topic of credit ratings. However we still believe that there are interesting questions to be answered.

Even though we have included all rating updates that have been made public during our sample period, we still lack data in order to get more powerful results in some of our sub-samples. Hence, it would be interesting to look at a larger market than the Scandinavian and/or to extend the sample period. Additionally, to attain more robust results one could specify the data at a lower level. In example, a rating change from "AAA" to "A" will perhaps affect stock prices more than a change from "AAA" to "AA". This is a limitation in our study as we have treated all rating changes equally.

Another interesting approach would be to look at the conflict of interest concerning credit ratings, especially the companies' option to disclose a particular rating. The norm regarding payment of a credit rating is that the companies only pay for the rating if it is made public. In order to investigate this, it requires extensive inside information from the CRAs or the issuing companies.

A third interesting topic would be to investigate if the announcement effect from credit rating updates differ in magnitude dependent on market cycles and state of the economy. More specific, examine if the CRAs achieve more or less credibility after or during financial crises and/or big related events such as the Enron scandal.

10- Appendices

Appendix 5.3. Complete list of all rating updates.

Rating #	Rating firm	Country	Name	Date	Type	Outlook	New rating
1	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	01.02.2000	Upgrade	Stable outlook	Baa2
2	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	23.01.2001	Downgrade	Stable outlook	Baa3
3	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	20.07.2001	Watch update	Negative outlook	Baa3
4	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	01.10.2001	Downgrade	Stable outlook	Ba2
5	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	20.11.2001	Watch update	Uncertain outlook	Ba2
6	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	06.05.2003	Confirmation	Stable outlook	Ba2
7	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	18.11.2003	Confirmation	Stable outlook	Ba2
8	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	10.05.2004	Affirmation	Positive outlook	Ba2
9	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	22.02.2005	Upgrade	Stable outlook	Ba1
10	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	25.10.2005	Affirmation	Positive outlook	Ba1
11	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	07.06.2006	Affirmation	Positive outlook	Ba1
12	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	31.08.2006	Affirmation	Stable outlook	Ba1
13	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	11.01.2007	Affirmation	Stable outlook	Ba1
14	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	30.01.2009	Downgrade	Negative outlook	Ba2
15	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	29.06.2009	Downgrade	Negative outlook	Ba3
16	Moody's	Norway	ROYAL CRBN.CRUISES (OSL)	30.04.2010	Affirmation	Stable outlook	Ba3
18	Moody's	Norway	DNB	24.02.2007	Upgrade	No outlook	Aaa
19	Moody's	Norway	DNB	03.04.2007	Watch update	Negative outlook	Aaa
20	Moody's	Norway	DNB	10.04.2007	Downgrade	Stable outlook	Aa1
21	Moody's	Norway	DNB	12.11.2008	Affirmation	Negative outlook	Aa1
22	Moody's	Norway	DNB	22.07.2009	Watch update	Negative outlook	Aa1
23	Moody's	Norway	DNB	08.09.2009	Downgrade	Stable outlook	Aa3
24	Moody's	Norway	NORSK HYDRO	22.03.2001	Affirmation	Stable outlook	A2
25	Moody's	Norway	NORSK HYDRO	07.02.2002	Affirmation	Negative outlook	A2
26	Moody's	Norway	NORSK HYDRO	20.06.2003	Affirmation	Stable outlook	A2
27	Moody's	Norway	NORSK HYDRO	28.11.2003	Affirmation	Stable outlook	A2
28	Moody's	Norway	NORSK HYDRO	23.06.2005	Upgrade	Stable outlook	A1
29	Moody's	Norway	NORSK HYDRO	16.02.2006	Watch update	Negative outlook	A1
30	Moody's	Norway	NORSK HYDRO	24.04.2006	Downgrade	Stable outlook	A2
31	Moody's	Norway	NORSK HYDRO	18.12.2006	Affirmation	Developing	A2
32	Moody's	Norway	NORSK HYDRO	03.05.2007	New	Stable outlook	Baa1
33	Moody's	Norway	NORSK HYDRO	30.01.2009	Watch update	Negative outlook	Baa1
34	Moody's	Norway	NORSK HYDRO	18.03.2009	Downgrade	Negative outlook	Baa2
35	Moody's	Norway	NORSK HYDRO	04.05.2010	Affirmation	Stable outlook	Baa2
36	Moody's	Norway	PETROLEUM GEO SERVICES	31.03.2005	New	Stable outlook	Ba3
37	Moody's	Norway	PETROLEUM GEO SERVICES	14.06.2007	Upgrade	Stable outlook	Ba2
39	Moody's	Norway	YARA INTERNATIONAL	30.11.2004	New	Stable outlook	Baa2
40	Moody's	Norway	YARA INTERNATIONAL	06.12.2004	Confirmation	No outlook	Baa2
41	Moody's	Norway	YARA INTERNATIONAL	04.06.2009	New	No outlook	Baa2
42	Moody's	Norway	YARA INTERNATIONAL	04.06.2009	Confirmation	No outlook	Baa2
43	Moody's	Norway	YARA INTERNATIONAL	15.02.2010	Watch update	Negative outlook	Baa2
44	Moody's	Norway	YARA INTERNATIONAL	17.02.2010	Confirmation	Stable outlook	Baa2
45	Moody's	Norway	TELENOR	16.05.2000	Watch update	Negative outlook	
46	Moody's	Norway	TELENOR	12.01.2001	Downgrade	Stable outlook	A2
47	Moody's	Norway	TELENOR	26.07.2001	Affirmation	Stable outlook	A2
48	Moody's	Norway	TELENOR	31.10.2005	Watch update	Negative outlook	A2
49	Moody's	Norway	TELENOR	16.03.2006	Confirmation	Stable outlook	A2
50	Moody's	Norway	TELENOR	29.10.2008	Watch update	Negative outlook	A2
51	Moody's	Norway	TELENOR	27.01.2009	Downgrade	Stable outlook	A3
52	Moody's	Norway	STOREBRAND	26.11.2001	New	Negative outlook	Baa1
53	Moody's	Norway	STOREBRAND	29.05.2002	Watch update	Positive outlook	Baa1
54	Moody's	Norway	STOREBRAND	01.07.2002	Confirmation	Negative outlook	Baa1
55	Moody's	Norway	STOREBRAND	21.08.2002	Watch update	Negative outlook	Baa1
56	Moody's	Norway	STOREBRAND	02.05.2003	Downgrade	Negative outlook	Baa3
57	Moody's	Norway	STOREBRAND	05.08.2003	Affirmation	Stable outlook	Baa3
58	Moody's	Norway	STOREBRAND	17.09.2003	Confirmation	Stable outlook	Baa3
59	Moody's	Norway	STOREBRAND	18.05.2004	Affirmation	Positive outlook	Baa3
60	Moody's	Norway	STOREBRAND	08.08.2005	Upgrade	Stable outlook	Baa2
61	Moody's	Norway	STOREBRAND	29.10.2008	Affirmation	Negative outlook	Baa2
62	Moody's	Norway	STOREBRAND	07.05.2009	Downgrade	Stable outlook	Baa3
63	Moody's	Norway	STATOIL	23.11.2000	Watch update	Negative outlook	
64	Moody's	Norway	STATOIL	14.05.2001	Downgrade	Stable outlook	A1
65	Moody's	Norway	STATOIL	23.06.2005	Downgrade	No outlook	Aa2
66	Moody's	Norway	STATOIL	31.10.2007	Upgrade	No outlook	Aa2
67	Moody's	Norway	AKER SOLUTIONS	18.03.2004	New	Stable outlook	B2
68	Moody's	Norway	AKER SOLUTIONS	13.05.2005	Upgrade	Positive outlook	Ba3
69	Moody's	Norway	AKER SOLUTIONS	24.04.2006	Upgrade	Stable outlook	Ba1
70	Moody's	Norway	DNO INTERNATIONAL	05.11.2003	New	Stable outlook	Caa2
71	Moody's	Norway	NORSKE SKOGINDUSTRIER	12.10.2001	New	Stable outlook	Baa3
72	Moody's	Norway	NORSKE SKOGINDUSTRIER	18.10.2005	Affirmation	Negative outlook	Baa3
73	Moody's	Norway	NORSKE SKOGINDUSTRIER	28.02.2006	Watch update	Negative outlook	Baa3
74	Moody's	Norway	NORSKE SKOGINDUSTRIER	20.04.2006	Downgrade	Stable outlook	Ba1
75	Moody's	Norway	NORSKE SKOGINDUSTRIER	17.04.2007	Affirmation	Negative outlook	Ba1
76	Moody's	Norway	NORSKE SKOGINDUSTRIER	02.11.2007	Downgrade	Negative outlook	Ba2
77	Moody's	Norway	NORSKE SKOGINDUSTRIER	01.04.2008	Downgrade	Negative outlook	B1
78	Moody's	Norway	NORSKE SKOGINDUSTRIER	13.02.2009	Downgrade	Stable outlook	B2
79	Moody's	Norway	NORSKE SKOGINDUSTRIER	03.09.2009	Affirmation	Negative outlook	B2
83	Moody's	Norway	NORTHERN OFFSHORE (OSL)	15.05.2002	Downgrade	No outlook	Caa2

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84	Moody's	Norway	SONGA OFFSHORE	27.01.2010	New	Stable outlook	Caa1
85	Moody's	Denmark	CARLSBERG 'B'	26.01.2006	New	Stable outlook	Baa3
86	Moody's	Denmark	CARLSBERG 'B'	25.01.2008	Watch update	Negative outlook	Baa3
87	Moody's	Denmark	CARLSBERG 'B'	16.05.2008	Confirmation	Stable outlook	Baa3
89	Moody's	Denmark	DANSKE BANK	02.10.2000	Confirmation	Positive outlook	Aa3
90	Moody's	Denmark	DANSKE BANK	29.01.2001	Upgrade	No outlook	Aa2
91	Moody's	Denmark	DANSKE BANK	16.03.2004	Watch update	Positive outlook	Aa2
92	Moody's	Denmark	DANSKE BANK	06.04.2004	Upgrade	No outlook	Aa1
93	Moody's	Denmark	DANSKE BANK	14.12.2004	Affirmation	Stable outlook	Aa1
94	Moody's	Denmark	DANSKE BANK	24.02.2007	Upgrade	No outlook	Aaa
95	Moody's	Denmark	DANSKE BANK	03.04.2007	Watch update	Negative outlook	Aaa
96	Moody's	Denmark	DANSKE BANK	10.04.2007	Downgrade	No outlook	Aa1
97	Moody's	Denmark	DANSKE BANK	12.11.2008	Watch update	Negative outlook	Aa1
98	Moody's	Denmark	DANSKE BANK	13.02.2009	Downgrade	Stable outlook	Aa3
99	Moody's	Denmark	JYSKE BANK	24.02.2007	Upgrade	No outlook	Aa1
100	Moody's	Denmark	JYSKE BANK	03.04.2007	Watch update	Negative outlook	Aa1
101	Moody's	Denmark	JYSKE BANK	10.04.2007	Downgrade	No outlook	Aa2
102	Moody's	Denmark	JYSKE BANK	22.07.2009	Watch update	Negative outlook	Aa2
103	Moody's	Denmark	JYSKE BANK	08.09.2009	Downgrade	No outlook	A1
104	Moody's	Denmark	SYDBANK	24.02.2007	Upgrade	No outlook	Aa2
105	Moody's	Denmark	SYDBANK	03.04.2007	Watch update	Negative outlook	Aa2
106	Moody's	Denmark	SYDBANK	10.04.2007	Downgrade	No outlook	Aa3
107	Moody's	Denmark	SYDBANK	22.07.2009	Watch update	Negative outlook	Aa3
108	Moody's	Denmark	SYDBANK	08.09.2009	Downgrade	No outlook	A1
109	Moody's	Denmark	NOVO NORDISK 'B'	30.04.2004	New	No outlook	A2
110	Moody's	Denmark	TDC	14.11.2000	Watch update	Negative outlook	Aa3
111	Moody's	Denmark	TDC	19.02.2001	Downgrade	Stable outlook	A2
112	Moody's	Denmark	TDC	19.03.2002	Watch update	Negative outlook	A2
113	Moody's	Denmark	TDC	03.05.2002	Downgrade	Stable outlook	A3
114	Moody's	Denmark	TDC	28.02.2003	Watch update	Negative outlook	A3
115	Moody's	Denmark	TDC	06.08.2003	Downgrade	Negative outlook	Baa1
116	Moody's	Denmark	TDC	14.09.2004	Affirmation	Negative outlook	Baa1
117	Moody's	Denmark	TDC	06.10.2005	Watch update	Negative outlook	Baa1
118	Moody's	Denmark	TDC	30.11.2005	Downgrade	Negative outlook	Ba1
119	Moody's	Denmark	TDC	13.04.2006	Downgrade	Stable outlook	Ba3
120	Moody's	Denmark	TDC	29.03.2007	Downgrade	Stable outlook	B1
121	Moody's	Denmark	TDC	30.01.2009	Upgrade	Positive outlook	Ba3
122	Moody's	Denmark	TDC	20.09.2010	Watch update	Positive outlook	Ba3
123	Moody's	Denmark	BANKNORDIK	16.05.2008	New	No outlook	A3
124	Moody's	Denmark	BANKNORDIK	15.02.2010	Watch update	Negative outlook	A3
125	Moody's	Denmark	BANKNORDIK	06.09.2010	Confirmation	Stable outlook	A3
126	Moody's	Denmark	RINGKJOBING LANDBOBANK	22.05.2007	New	Stable outlook	A1
127	Moody's	Denmark	RINGKJOBING LANDBOBANK	22.07.2009	Watch update	Negative outlook	A1
128	Moody's	Denmark	RINGKJOBING LANDBOBANK	08.09.2009	Confirmation	Negative outlook	A1
129	Moody's	Denmark	SPAR NORD BANK	06.08.2007	New	Stable outlook	A1
130	Moody's	Denmark	SPAR NORD BANK	22.07.2009	Watch update	Negative outlook	A1
131	Moody's	Denmark	SPAR NORD BANK	08.09.2009	Downgrade	No outlook	A2
132	Moody's	Denmark	SPARBANK	03.06.2010	New	Stable outlook	Aaa
133	Moody's	Denmark	SPAREKASSEN LOLLAND	17.06.2010	New	Stable outlook	Aaa
134	Moody's	Denmark	VESTJYSK BANK	16.06.2010	New	Stable outlook	Aaa
135	Moody's	Denmark	TRYG	07.03.2000	Confirmation	Stable outlook	A2
136	Moody's	Denmark	TRYG	30.03.2001	Upgrade	Stable outlook	A1
137	Moody's	Denmark	TRYG	31.10.2001	Watch update	Negative outlook	
138	Moody's	Denmark	TRYG	19.06.2002	Downgrade	Stable outlook	A3
139	Moody's	Denmark	TRYG	01.05.2003	Watch update	Negative outlook	
140	Moody's	Denmark	TRYG	24.06.2003	Confirmation	Stable outlook	A3
141	Moody's	Denmark	TRYG	14.03.2007	Watch update	Positive outlook	A3
142	Moody's	Denmark	TRYG	23.05.2007	Upgrade	Stable outlook	A2
143	Moody's	Denmark	NORDEA BANK (CSE)	19.06.2003	Confirmation	Stable outlook	Aa3
144	Moody's	Denmark	NORDEA BANK (CSE)	01.03.2004	Confirmation	Stable outlook	Aa3
145	Moody's	Denmark	NORDEA BANK (CSE)	24.02.2007	Upgrade	No outlook	Aaa
146	Moody's	Denmark	NORDEA BANK (CSE)	03.04.2007	Watch update	Negative outlook	Aaa
147	Moody's	Denmark	NORDEA BANK (CSE)	10.04.2007	Downgrade	No outlook	Aa1
148	Moody's	Denmark	NORDEA BANK (CSE)	22.07.2009	Watch update	Negative outlook	Aa1
149	Moody's	Denmark	NORDEA BANK (CSE)	08.09.2009	Downgrade	Negative outlook	Aa2
150	Moody's	Sweden	INVESTOR 'B'	04.09.2002	Watch update	Negative outlook	A2
151	Moody's	Sweden	INVESTOR 'B'	14.11.2002	Downgrade	Stable outlook	Baa1
152	Moody's	Sweden	INVESTOR 'B'	11.10.2004	Upgrade	Stable outlook	A3
153	Moody's	Sweden	INVESTOR 'B'	10.01.2005	Watch update	Positive outlook	A3
154	Moody's	Sweden	INVESTOR 'B'	17.02.2005	Upgrade	Stable outlook	A2
155	Moody's	Sweden	INVESTOR 'B'	12.12.2005	Affirmation	Positive outlook	A2
156	Moody's	Sweden	INVESTOR 'B'	12.11.2007	Upgrade	Stable outlook	A1
157	Moody's	Sweden	NORDEA BANK	01.03.2004	New	Stable outlook	Aa3
158	Moody's	Sweden	NORDEA BANK	24.02.2007	Upgrade	No outlook	Aaa
159	Moody's	Sweden	NORDEA BANK	03.04.2007	Watch update	Negative outlook	Aaa
160	Moody's	Sweden	NORDEA BANK	10.04.2007	Downgrade	No outlook	Aa1
161	Moody's	Sweden	NORDEA BANK	22.07.2009	Watch update	Negative outlook	Aa1
162	Moody's	Sweden	NORDEA BANK	08.09.2009	Downgrade	Stable outlook	Aa2
163	Moody's	Sweden	SEB 'A'	22.02.2001	Watch update	Positive outlook	A2
164	Moody's	Sweden	SEB 'A'	19.09.2001	Confirmation	Stable outlook	A2
165	Moody's	Sweden	SEB 'A'	09.01.2003	Upgrade	Stable outlook	A1
166	Moody's	Sweden	SEB 'A'	03.11.2003	Watch update	Positive outlook	A1
167	Moody's	Sweden	SEB 'A'	17.02.2004	Upgrade	No outlook	Aa3
168	Moody's	Sweden	SEB 'A'	24.02.2007	Upgrade	No outlook	Aa1

169	Moody's	Sweden	SEB 'A'	03.04.2007	Watch update	Negative outlook	Aa1
170	Moody's	Sweden	SEB 'A'	10.04.2007	Downgrade	No outlook	Aa2
171	Moody's	Sweden	SEB 'A'	07.04.2009	Downgrade	Negative outlook	A1
172	Moody's	Sweden	SWEDBANK 'A'	22.02.2001	Confirmation	No outlook	Aa3
173	Moody's	Sweden	SWEDBANK 'A'	19.09.2001	Confirmation	Stable outlook	Aa3
174	Moody's	Sweden	SWEDBANK 'A'	15.04.2004	Affirmation	Positive outlook	Aa3
175	Moody's	Sweden	SWEDBANK 'A'	02.06.2006	Affirmation	Stable outlook	Aa3
176	Moody's	Sweden	SWEDBANK 'A'	24.02.2007	Upgrade	No outlook	Aa3
177	Moody's	Sweden	SWEDBANK 'A'	18.01.2008	Watch update	Negative outlook	Aa1
178	Moody's	Sweden	SWEDBANK 'A'	27.06.2008	Downgrade	Negative outlook	Aa2
179	Moody's	Sweden	SWEDBANK 'A'	10.10.2008	Downgrade	Negative outlook	Aa3
180	Moody's	Sweden	SWEDBANK 'A'	27.02.2009	Downgrade	Negative outlook	A1
181	Moody's	Sweden	SWEDBANK 'A'	27.04.2009	Watch update	Negative outlook	A1
182	Moody's	Sweden	SWEDBANK 'A'	22.07.2009	Watch update	Negative outlook	A1
183	Moody's	Sweden	SWEDBANK 'A'	08.09.2009	Downgrade	Negative outlook	A2
184	Moody's	Sweden	SWEDBANK 'A'	22.06.2010	Affirmation	Stable outlook	A2
186	Moody's	Sweden	Svenska handelsbanken	20.12.2000	Confirmation	Stable outlook	Aa2
187	Moody's	Sweden	Svenska handelsbanken	02.06.2003	Affirmation	Positive outlook	Aa2
188	Moody's	Sweden	Svenska handelsbanken	16.03.2004	Upgrade	Stable outlook	Aa1
189	Moody's	Sweden	Svenska handelsbanken	22.07.2009	Watch update	Negative outlook	Aa1
190	Moody's	Sweden	Svenska handelsbanken	08.09.2009	Downgrade	Stable outlook	Aa2
191	Moody's	Sweden	Atlas Copco AB	02.11.2000	Confirmation	Negative outlook	A3
192	Moody's	Sweden	Atlas Copco AB	10.06.2003	Affirmation	Stable outlook	A3
193	Moody's	Sweden	Atlas Copco AB	05.02.2007	Affirmation	Stable outlook	A3
194	Moody's	Sweden	SKF 'B'	29.03.2001	Upgrade	Stable outlook	Baa1
195	Moody's	Sweden	SKF 'B'	03.05.2002	Confirmation	Positive outlook	Baa1
196	Moody's	Sweden	SKF 'B'	14.03.2003	Watch update	Positive outlook	Baa1
197	Moody's	Sweden	SKF 'B'	13.05.2003	Upgrade	Stable outlook	A3
198	Moody's	Sweden	SKF 'B'	25.02.2009	Affirmation	Negative outlook	A3
199	Moody's	Sweden	SKF 'B'	21.10.2010	Affirmation	Stable outlook	A3
200	Moody's	Sweden	VOLVO 'B'	18.10.2005	New	Stable outlook	A3
201	Moody's	Sweden	VOLVO 'B'	09.01.2009	Watch update	Negative outlook	A3
202	Moody's	Sweden	VOLVO 'B'	13.02.2009	Downgrade	Stable outlook	Baa1
203	Moody's	Sweden	VOLVO 'B'	30.04.2009	Affirmation	Negative outlook	Baa1
204	Moody's	Sweden	VOLVO 'B'	24.07.2009	Downgrade	Stable outlook	Baa2
205	Moody's	Sweden	Svenska Cellulosa AB SCA	31.05.2000	Confirmation	Stable outlook	A3
206	Moody's	Sweden	Svenska Cellulosa AB SCA	22.01.2001	Confirmation	Stable outlook	A3
207	Moody's	Sweden	Svenska Cellulosa AB SCA	20.02.2002	Affirmation	Stable outlook	A3
208	Moody's	Sweden	Svenska Cellulosa AB SCA	03.12.2003	Affirmation	Stable outlook	A3
209	Moody's	Sweden	Svenska Cellulosa AB SCA	03.02.2005	Watch update	Negative outlook	A3
210	Moody's	Sweden	Svenska Cellulosa AB SCA	22.03.2005	Confirmation	Negative outlook	A3
211	Moody's	Sweden	Svenska Cellulosa AB SCA	17.11.2005	Downgrade	Negative outlook	Baa1
212	Moody's	Sweden	Svenska Cellulosa AB SCA	09.11.2007	Affirmation	Stable outlook	Baa1
213	Moody's	Sweden	Svenska Cellulosa AB SCA	30.10.2008	Affirmation	Negative outlook	Baa1
214	Moody's	Sweden	Svenska Cellulosa AB SCA	29.10.2009	Affirmation	Stable outlook	Baa1
215	Moody's	Sweden	TELIASONERA	08.01.2003	Downgrade	Negative outlook	A2
216	Moody's	Sweden	TELIASONERA	24.05.2004	Affirmation	Positive outlook	A2
217	Moody's	Sweden	TELIASONERA	30.03.2005	Affirmation	Stable outlook	A2
218	Moody's	Sweden	TELIASONERA	23.06.2005	Affirmation	Stable outlook	A2
219	Moody's	Sweden	TELIASONERA	31.10.2006	Affirmation	Negative outlook	A2
220	Moody's	Sweden	TELIASONERA	30.10.2007	Downgrade	Stable outlook	A3
221	Moody's	Sweden	SAS	05.03.2004	Watch update	Negative outlook	Baa3
222	Moody's	Sweden	SAS	27.05.2004	Downgrade	Stable outlook	B1
223	Moody's	Sweden	SAS	12.08.2004	Affirmation	Negative outlook	B1
224	Moody's	Sweden	SAS	25.01.2005	Watch update	Negative outlook	B1
225	Moody's	Sweden	SAS	25.05.2005	Downgrade	Negative outlook	B2
226	Moody's	Sweden	SAS	23.06.2005	Upgrade	No outlook	B1
227	Moody's	Sweden	SAS	24.06.2008	Affirmation	Stable outlook	B1
228	Moody's	Sweden	SAS	07.11.2008	Downgrade	Negative outlook	B2
229	Moody's	Sweden	SAS	17.08.2009	Downgrade	Negative outlook	B3
230	Moody's	Sweden	SAS	12.11.2009	Downgrade	Negative outlook	Caa1
231	Moody's	Sweden	SAS	11.02.2010	Watch update	Negative outlook	Caa1
232	Moody's	Sweden	SAS	12.05.2010	Confirmation	Stable outlook	Caa1
233	Standar&Poor's	Sweden	ASSA ABLOY 'B'	15.12.2010	Watch update	Negative outlook	A-
234	Standar&Poor's	Sweden	ASSA ABLOY 'B'	18.02.2010	Affirmation	Stable outlook	A-
235	Standar&Poor's	Sweden	ASSA ABLOY 'B'	27.01.2009	Affirmation	Negative outlook	A-
236	Standar&Poor's	Sweden	ASSA ABLOY 'B'	21.09.2001	New	Stable outlook	A-
237	Standar&Poor's	Sweden	AUTOLIV SDB	27.07.2010	Upgrade	Stable outlook	BBB+
238	Standar&Poor's	Sweden	AUTOLIV SDB	26.11.2009	Upgrade	Stable outlook	BBB
239	Standar&Poor's	Sweden	AUTOLIV SDB	25.03.2009	Affirmation	Stable outlook	BBB-
240	Standar&Poor's	Sweden	AUTOLIV SDB	19.02.2009	Downgrade	Negative outlook	BBB-
241	Standar&Poor's	Sweden	AUTOLIV SDB	21.11.2008	Downgrade	Negative outlook	BBB+
242	Standar&Poor's	Sweden	AUTOLIV SDB	01.08.2008	Affirmation	Negative outlook	A-
243	Standar&Poor's	Sweden	AUTOLIV SDB	12.08.2005	Upgrade	Stable outlook	A-
244	Standar&Poor's	Sweden	AUTOLIV SDB	06.06.2000	New	Stable outlook	BBB+
245	Standar&Poor's	Denmark	DANSKE BANK	18.12.2009	Downgrade	Negative outlook	A
246	Standar&Poor's	Denmark	DANSKE BANK	05.02.2009	Downgrade	Negative outlook	A+
247	Standar&Poor's	Denmark	DANSKE BANK	22.10.2008	Affirmation	Negative outlook	AA-
248	Standar&Poor's	Denmark	DANSKE BANK	29.06.2001	Upgrade	Stable outlook	AA-
249	Standar&Poor's	Norway	DNB	18.12.2009	Downgrade	Stable outlook	A+
250	Standar&Poor's	Norway	DNB	30.01.2009	Affirmation	Negative outlook	AA-
251	Standar&Poor's	Norway	DNB	14.04.2008	Upgrade	Stable outlook	AA-
252	Standar&Poor's	Norway	DNB	30.03.2007	Affirmation	Positive outlook	A+
253	Standar&Poor's	Sweden	ELECTROLUX 'B'	09.11.2010	Upgrade	Stable outlook	BBB+

254	Standar&Poor's	Sweden	ELECTROLUX 'B'	17.12.2008	Downgrade	Stable outlook	BBB
255	Standar&Poor's	Sweden	ERICSSON 'B'	03.03.2009	Affirmation	Stable outlook	BBB+
256	Standar&Poor's	Sweden	ERICSSON 'B'	27.11.2007	Affirmation	Negative outlook	BBB+
257	Standar&Poor's	Sweden	ERICSSON 'B'	15.06.2007	Upgrade	Stable outlook	BBB+
258	Standar&Poor's	Sweden	ERICSSON 'B'	01.06.2007	Watch update	Positive outlook	BBB-
259	Standar&Poor's	Sweden	ERICSSON 'B'	29.08.2006	Affirmation	Positive outlook	BBB-
260	Standar&Poor's	Sweden	ERICSSON 'B'	26.10.2005	Affirmation	Stable outlook	BBB-
261	Standar&Poor's	Sweden	ERICSSON 'B'	28.02.2005	Upgrade	Positive outlook	BBB-
262	Standar&Poor's	Sweden	ERICSSON 'B'	10.11.2004	Upgrade	Positive outlook	BB+
263	Standar&Poor's	Sweden	ERICSSON 'B'	03.08.2004	Affirmation	Stable outlook	BB
264	Standar&Poor's	Sweden	ERICSSON 'B'	07.11.2002	Downgrade	Negative outlook	BB
265	Standar&Poor's	Sweden	ERICSSON 'B'	01.08.2002	Downgrade	Negative outlook	BB+
266	Standar&Poor's	Sweden	ERICSSON 'B'	22.07.2002	Downgrade	Negative outlook	BBB-
267	Standar&Poor's	Sweden	ERICSSON 'B'	16.05.2002	Downgrade	Negative outlook	BBB
268	Standar&Poor's	Sweden	ERICSSON 'B'	23.04.2002	Watch update	Negative outlook	BBB+
269	Standar&Poor's	Sweden	ERICSSON 'B'	13.11.2001	Downgrade	Negative outlook	BBB+
270	Standar&Poor's	Sweden	ERICSSON 'B'	14.05.2001	Downgrade	Negative outlook	A-
271	Standar&Poor's	Sweden	ERICSSON 'B'	13.03.2001	Watch update	Negative outlook	A
272	Standar&Poor's	Sweden	ERICSSON 'B'	30.01.2001	Downgrade	Negative outlook	A
273	Standar&Poor's	Sweden	HOLMEN 'B'	15.12.2010	Affirmation	Stable outlook	BBB
274	Standar&Poor's	Sweden	HOLMEN 'B'	17.02.2010	Affirmation	Negative outlook	BBB
275	Standar&Poor's	Sweden	HOLMEN 'B'	09.12.2009	Downgrade	Stable outlook	BBB
276	Standar&Poor's	Sweden	INDUSTRIVARDEN 'C'	21.11.2008	Downgrade	Negative outlook	A
277	Standar&Poor's	Sweden	INDUSTRIVARDEN 'C'	17.05.2000	New	Stable outlook	A+
278	Standar&Poor's	Denmark	JYSKE BANK	20.02.2009	Downgrade	Negative outlook	A
279	Standar&Poor's	Denmark	JYSKE BANK	30.09.2008	Affirmation	Negative outlook	A+
280	Standar&Poor's	Denmark	JYSKE BANK	04.06.2007	Upgrade	Stable outlook	A+
281	Standar&Poor's	Denmark	JYSKE BANK	02.05.2006	New	Positive outlook	A
282	Standar&Poor's	Sweden	LUNDBERGFORETAGEN 'B'	08.06.2007	Upgrade	Stable outlook	A+
283	Standar&Poor's	Sweden	LUNDBERGFORETAGEN 'B'	24.01.2001	New	Stable outlook	A
284	Standar&Poor's	Sweden	NORDEA BANK	29.11.2005	Upgrade	Stable outlook	AA-
285	Standar&Poor's	Sweden	NORDEA BANK	09.11.2004	Affirmation	Positive outlook	A+
286	Standar&Poor's	Sweden	NORDEA BANK	01.03.2004	New	Stable outlook	A+
287	Standar&Poor's	Denmark	NORDEA BANK (CSE)	29.11.2005	Upgrade	Stable outlook	AA-
288	Standar&Poor's	Denmark	NORDEA BANK (CSE)	09.11.2004	Affirmation	Positive outlook	A+
289	Standar&Poor's	Norway	NORSK HYDRO	19.11.2010	Upgrade	Stable outlook	BBB
290	Standar&Poor's	Norway	NORSK HYDRO	06.05.2010	Watch update	Positive outlook	BBB-
291	Standar&Poor's	Norway	NORSK HYDRO	20.03.2009	Downgrade	Negative outlook	BBB-
292	Standar&Poor's	Norway	NORSK HYDRO	20.01.2009	Watch update	Negative outlook	BBB
293	Standar&Poor's	Norway	NORSK HYDRO	03.08.2007	Downgrade	Stable outlook	BBB
294	Standar&Poor's	Norway	NORSK HYDRO	18.12.2006	Watch update	Negative outlook	A-
295	Standar&Poor's	Norway	NORSK HYDRO	02.06.2006	Downgrade	Stable outlook	A-
296	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	12.08.2010	Downgrade	Negative outlook	B-
297	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	17.02.2010	Downgrade	Negative outlook	B
298	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	19.05.2009	Downgrade	Negative outlook	B+
299	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	23.09.2008	Affirmation	Negative outlook	BB-
300	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	21.04.2008	Downgrade	Negative outlook	BB-
301	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	28.01.2008	Downgrade	Negative outlook	BB
302	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	22.10.2007	Affirmation	Negative outlook	BB+
303	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	14.11.2006	Downgrade	Stable outlook	BB+
304	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	20.10.2006	Watch update	Negative outlook	BBB-
305	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	21.03.2006	Affirmation	Negative outlook	BBB-
306	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	08.04.2004	Downgrade	Stable outlook	BBB-
307	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	18.03.2004	Watch update	Negative outlook	BBB
308	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	25.03.2003	Affirmation	Negative outlook	BBB
309	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	05.02.2003	Watch update	Negative outlook	BBB
310	Standar&Poor's	Norway	NORSKE SKOGINDUSTRIER	12.10.2001	New	Stable outlook	BBB
311	Standar&Poor's	Denmark	NOVO NORDISK 'B'	13.06.2007	Upgrade	Stable outlook	A
312	Standar&Poor's	Denmark	NOVO NORDISK 'B'	29.04.2004	New	Positive outlook	A-
313	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	02.12.2010	Upgrade	Stable outlook	BB
314	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	12.02.2010	Affirmation	Positive outlook	BB-
315	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	10.07.2006	Upgrade	Stable outlook	BB-
316	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	31.03.2006	Watch update	Uncertain outlook	B+
317	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	06.05.2005	New	Stable outlook	B+
318	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	30.07.2003	Downgrade	No outlook	D
319	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	30.12.2002	Downgrade	Negative outlook	CC
320	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	20.11.2002	Downgrade	Negative outlook	CCC+
321	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	29.10.2002	Downgrade	Negative outlook	B
322	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	26.09.2002	Watch update	Uncertain outlook	BB-
323	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	31.07.2002	Downgrade	Negative outlook	BB-
324	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	03.05.2002	Watch update	Negative outlook	BBB-
325	Standar&Poor's	Norway	PETROLEUM GEO SERVICES	19.01.2001	Downgrade	Stable outlook	BBB-
326	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	17.11.2010	Upgrade	Stable outlook	BB
327	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	28.04.2010	Affirmation	Stable outlook	BB-
328	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	26.03.2009	Downgrade	Negative outlook	BB-
329	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	05.12.2008	Downgrade	Negative outlook	BB
330	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	07.11.2008	Watch update	Negative outlook	BB+
331	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	03.04.2008	Downgrade	Stable outlook	BB+
332	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	03.11.2006	Affirmation	Negative outlook	BBB-
333	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	31.08.2006	Watch update	Negative outlook	BBB-
334	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	12.01.2006	Upgrade	Stable outlook	BBB-
335	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	09.11.2005	Watch update	Positive outlook	BB+
336	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	02.02.2005	Affirmation	Positive outlook	BB+
337	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	04.03.2004	Affirmation	Stable outlook	BB+

338	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	20.11.2001	Watch update	Positive outlook	BB+
339	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	19.09.2001	Upgrade	Negative outlook	BB+
340	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	13.07.2001	Affirmation	Negative outlook	BBB-
341	Standar&Poor's	Norway	ROYAL CRBN.CRUISES (OSL)	22.01.2001	Downgrade	Stable outlook	BBB-
342	Standar&Poor's	Sweden	SANDVIK	09.03.2010	Downgrade	Stable outlook	BBB
343	Standar&Poor's	Sweden	SANDVIK	12.01.2010	Watch update	Negative outlook	A-
344	Standar&Poor's	Sweden	SANDVIK	04.06.2009	Affirmation	Negative outlook	A-
345	Standar&Poor's	Sweden	SANDVIK	02.03.2009	Downgrade	Negative outlook	A-
346	Standar&Poor's	Sweden	SANDVIK	12.02.2009	Watch update	Negative outlook	A
347	Standar&Poor's	Sweden	SANDVIK	11.11.2008	Affirmation	Negative outlook	A
348	Standar&Poor's	Sweden	SANDVIK	20.05.2008	Downgrade	Stable outlook	A
349	Standar&Poor's	Sweden	SAS	16.12.2010	Affirmation	Stable outlook	B-
350	Standar&Poor's	Sweden	SAS	06.11.2009	Downgrade	Negative outlook	B-
351	Standar&Poor's	Sweden	SAS	13.08.2009	Affirmation	Negative outlook	B
352	Standar&Poor's	Sweden	SAS	06.05.2009	Affirmation	Stable outlook	B
353	Standar&Poor's	Sweden	SAS	03.02.2009	Watch update	Positive outlook	B
354	Standar&Poor's	Sweden	SAS	06.11.2008	Downgrade	Developing	B
355	Standar&Poor's	Sweden	SAS	15.09.2008	Affirmation	Developing	BB-
356	Standar&Poor's	Sweden	SAS	21.08.2008	Affirmation	Negative outlook	BB-
357	Standar&Poor's	Sweden	SAS	22.07.2008	Downgrade	Stable outlook	BB-
358	Standar&Poor's	Sweden	SAS	30.04.2008	Watch update	Negative outlook	BB
359	Standar&Poor's	Sweden	SAS	30.10.2007	Affirmation	Negative outlook	BB
360	Standar&Poor's	Sweden	SAS	04.09.2007	New	Stable outlook	BB
361	Standar&Poor's	Sweden	SCANIA 'B'	31.08.2009	Affirmation	Negative outlook	A-
362	Standar&Poor's	Sweden	SCANIA 'B'	08.05.2009	Watch update	Negative outlook	A-
363	Standar&Poor's	Sweden	SCANIA 'B'	25.07.2007	Affirmation	Stable outlook	A-
364	Standar&Poor's	Sweden	SCANIA 'B'	14.09.2006	Watch update	Negative outlook	A-
365	Standar&Poor's	Sweden	SCANIA 'B'	01.06.2004	Affirmation	Stable outlook	A-
366	Standar&Poor's	Sweden	SCANIA 'B'	29.10.2001	New	Developing	A-
367	Standar&Poor's	Sweden	SECURITAS 'B'	25.10.2000	New	Stable outlook	BBB+
368	Standar&Poor's	Sweden	SEB 'A'	23.02.2010	Affirmation	Stable outlook	A
369	Standar&Poor's	Sweden	SEB 'A'	31.03.2009	Affirmation	Negative outlook	A
370	Standar&Poor's	Sweden	SEB 'A'	05.02.2009	Downgrade	Stable outlook	A
371	Standar&Poor's	Sweden	SEB 'A'	10.10.2008	Affirmation	Negative outlook	A+
372	Standar&Poor's	Sweden	SEB 'A'	17.10.2006	Upgrade	Stable outlook	A+
373	Standar&Poor's	Sweden	SEB 'A'	11.10.2005	Affirmation	Positive outlook	A
374	Standar&Poor's	Sweden	SEB 'A'	16.12.2003	Upgrade	Stable outlook	A
375	Standar&Poor's	Sweden	SKF 'B'	12.05.2003	Upgrade	Stable outlook	A-
376	Standar&Poor's	Sweden	SSAB 'A'	06.12.2010	Downgrade	Stable outlook	BB+
377	Standar&Poor's	Sweden	SSAB 'A'	12.11.2010	Watch update	Negative outlook	BBB-
378	Standar&Poor's	Sweden	SSAB 'A'	30.07.2009	Downgrade	Negative outlook	BBB-
379	Standar&Poor's	Sweden	SSAB 'A'	23.01.2009	Affirmation	Negative outlook	BBB
380	Standar&Poor's	Sweden	SSAB 'A'	17.03.2008	Affirmation	Stable outlook	BBB
381	Standar&Poor's	Sweden	SSAB 'A'	19.07.2007	Downgrade	Negative outlook	BBB
382	Standar&Poor's	Sweden	SSAB 'A'	04.05.2007	Watch update	Negative outlook	BBB+
383	Standar&Poor's	Sweden	SSAB 'A'	31.03.2000	New	Stable outlook	BBB+
384	Standar&Poor's	Norway	STATOIL	03.08.2007	Upgrade	Stable outlook	AA-
385	Standar&Poor's	Norway	STATOIL	18.12.2006	Watch update	Positive outlook	A+
386	Standar&Poor's	Norway	STATOIL	08.11.2006	Upgrade	Stable outlook	A+
387	Standar&Poor's	Norway	STATOIL	19.04.2004	Affirmation	Stable outlook	A
388	Standar&Poor's	Norway	STATOIL	24.06.2003	Affirmation	Negative outlook	A
389	Standar&Poor's	Norway	STATOIL	19.06.2001	Downgrade	Stable outlook	A
390	Standar&Poor's	Norway	STATOIL	15.11.2000	Watch update	Negative outlook	AA-
391	Standar&Poor's	Norway	STOREBRAND	15.12.2008	Downgrade	Stable outlook	BBB
392	Standar&Poor's	Norway	STOREBRAND	03.09.2007	Affirmation	Negative outlook	BBB+
393	Standar&Poor's	Norway	STOREBRAND	27.05.2005	Upgrade	Stable outlook	BBB+
394	Standar&Poor's	Norway	STOREBRAND	08.02.2005	Upgrade	Stable outlook	BBB
395	Standar&Poor's	Norway	STOREBRAND	12.02.2004	Affirmation	Positive outlook	BBB-
396	Standar&Poor's	Norway	STOREBRAND	21.08.2002	Downgrade	Stable outlook	BBB-
397	Standar&Poor's	Norway	STOREBRAND	30.07.2002	Affirmation	Negative outlook	BBB
398	Standar&Poor's	Sweden	Svenska Cellulosa AB SCA	27.09.2010	Affirmation	Stable outlook	BBB+
399	Standar&Poor's	Sweden	Svenska Cellulosa AB SCA	29.10.2008	Affirmation	Negative outlook	BBB+
400	Standar&Poor's	Sweden	Svenska Cellulosa AB SCA	17.10.2006	Downgrade	Stable outlook	BBB+
401	Standar&Poor's	Sweden	Svenska handelsbanken	11.11.2004	Upgrade	Stable outlook	AA-
402	Standar&Poor's	Denmark	TDC	15.12.2010	Upgrade	Stable outlook	BBB
403	Standar&Poor's	Denmark	TDC	20.09.2010	Watch update	Positive outlook	BB
404	Standar&Poor's	Denmark	TDC	14.06.2010	Upgrade	Positive outlook	BB
405	Standar&Poor's	Denmark	TDC	26.11.2009	Affirmation	Positive outlook	BB-
406	Standar&Poor's	Denmark	TDC	11.04.2006	Downgrade	Stable outlook	BB-
407	Standar&Poor's	Denmark	TDC	26.01.2006	Downgrade	Negative outlook	BB
408	Standar&Poor's	Denmark	TDC	06.10.2005	Watch update	Negative outlook	BBB+
409	Standar&Poor's	Denmark	TDC	13.03.2003	Downgrade	Stable outlook	BBB+
410	Standar&Poor's	Denmark	TDC	09.01.2003	Affirmation	Negative outlook	A-
411	Standar&Poor's	Denmark	TDC	19.03.2002	Downgrade	Stable outlook	A-
412	Standar&Poor's	Denmark	TDC	23.02.2001	Downgrade	Stable outlook	A
413	Standar&Poor's	Norway	TELENOR	12.04.2010	Affirmation	Negative outlook	A-
414	Standar&Poor's	Norway	TELENOR	10.02.2010	Watch update	Negative outlook	A-
415	Standar&Poor's	Norway	TELENOR	30.06.2009	Upgrade	Negative outlook	A-
416	Standar&Poor's	Norway	TELENOR	30.10.2008	Affirmation	Negative outlook	BBB+
417	Standar&Poor's	Norway	TELENOR	01.08.2006	Downgrade	Stable outlook	BBB+
418	Standar&Poor's	Norway	TELENOR	01.11.2005	Affirmation	Negative outlook	A-
419	Standar&Poor's	Sweden	TELIASONERA	28.10.2005	Downgrade	Stable outlook	A-
420	Standar&Poor's	Sweden	TELIASONERA	01.06.2005	Affirmation	Negative outlook	A

421	Standar&Poor's	Sweden	TELIASONERA	25.03.2005	Watch update	Negative outlook	A
422	Standar&Poor's	Sweden	TELIASONERA	23.05.2003	Affirmation	Stable outlook	A
423	Standar&Poor's	Sweden	TELIASONERA	05.02.2003	New	Negative outlook	A
424	Standar&Poor's	Norway	YARA INTERNATIONAL	16.11.2010	Affirmation	Stable outlook	BBB
425	Standar&Poor's	Norway	YARA INTERNATIONAL	15.03.2010	Affirmation	Negative outlook	BBB
426	Standar&Poor's	Norway	YARA INTERNATIONAL	15.02.2010	Watch update	Negative outlook	BBB
427	Standar&Poor's	Norway	YARA INTERNATIONAL	04.10.2007	Downgrade	Negative outlook	BBB
428	Standar&Poor's	Norway	YARA INTERNATIONAL	25.05.2007	Watch update	Negative outlook	BBB+
429	Standar&Poor's	Norway	YARA INTERNATIONAL	20.12.2005	Upgrade	Stable outlook	BBB+
430	Standar&Poor's	Norway	YARA INTERNATIONAL	30.11.2004	New	Stable outlook	BBB

Appendix 6.2.A F-test of equal variances between Moody's and S&P.

Table 6.2

F-test for equal variances	Pre announcement window t=-10 to t=-1		Inital window	t=0 to t=1	Short term window	t=0 to t=5
Downgrades: Moody's vs S&P	Sd(Moody's)^2	0,0240	Sd(Moody's)^2	0,0033	Sd(Moody's)^2	0,0131
	Sd(S&P)^2	0,0232	Sd(S&P)^2	0,0300	Sd(S&P)^2	0,0388
	F-stat	**1,0345**	**F-stat**	**8,9758**	**F-stat**	**2,9627**
	Degrees of freedom		Degrees of freedom		Degrees of freedom	
	V1	35	V1	55	V1	55
	V2	55	V2	35	V2	35
	Critical values:		Critical values:		Critical values:	
	0,99	1,836	0,99	1,936	0,99	1,936
	0,95	1,5343	0,95	1,5943	0,95	1,5943
Conclusion:	**Unequal sample size and equal variance**		**Unequal sample size and unequal variance**		**Unequal sample size and unequal variance**	
Upgrades: Moody's vs S&P	Sd(Moody's)^2	0,0014	Sd(Moody's)^2	0,0005	Sd(Moody's)^2	0,0011
	Sd(S&P)^2	0,0029	Sd(S&P)^2	0,0007	Sd(S&P)^2	0,0013
	F-stat	**1,9863**	**F-stat**	**1,3141**	**F-stat**	**1,1727**
	Degrees of freedom		Degrees of freedom		Degrees of freedom	
	V2	19	V2	19	V2	19
	V1	30	V1	30	V1	30
	Critical values:		Critical values:		Critical values:	
	0,99	2,844	0,99	2,844	0,99	2,844
	0,95	2,0712	0,95	2,0712	0,95	2,0712
Conclusion:	**Unequal sample size and equal variance**		**Unequal sample size and equal variance**		**Unequal sample size and equal variance**	
Negative Credit Watch: Moody's vs S&P	Sd(Moody's)^2	0,0088	Sd(Moody's)^2	0,0042	Sd(Moody's)^2	0,0048
	Sd(S&P)^2	0,0081	Sd(S&P)^2	0,0040	Sd(S&P)^2	0,0055
	F-stat	**1,0848**	**F-stat**	**1,0585**	**F-stat**	**1,1387**
	Degrees of freedom		Degrees of freedom		Degrees of freedom	
	V1	22	V1	22	V1	22
	V2	22	V2	22	V2	22
	Critical values:		Critical values:		Critical values:	
	0,99	2,827	0,99	2,827	0,99	2,827
	0,95	2,0707	0,95	2,0707	0,95	2,0707
Conclusion:	**Equal variance and sample size**		**Equal variance and sample size**		**Equal variance and sample size**	

Appendix 6.2.B. F-test of equal variances between high and low debt to equity.

F-test for equal variances	Pre announcement window	t=-10 to t=-1	Inital window	t=0 to t=1	Short term window	t=0 to t=5
Downgrades: D/E < 1 vs D/E > 1	S (D/E<1)^2	0,0096	S (D/E<1)^2	0,0016	S (D/E<1)^2	0,0044
	S (D/E>1)^2	0,0394	S (D/E>1)^2	0,0391	S (D/E>1)^2	0,0539
	F-stat	**4,1238**	**F-stat**	**23,8898**	**F-stat**	**12,2828**
	Degrees of freedom		Degrees of freedom		Degrees of freedom	
	V2	49	V2	49	V2	49
	V1	41	V1	41	V1	41
	Critical values:		Critical values:		Critical values:	
	0,99	2,114	0,99	2,114	0,99	2,114
	0,95	1,6928	0,95	1,6928	0,95	1,6928
Conclusion:	**Unequal sample size and unequal variance**		**Unequal sample size and unequal variance**		**Unequal sample size and unequal variance**	
Upgrades: D/E < 1 vs D/E > 1	Su<^2	0,0025	Su<^2	0,0005	Su<^2	0,0010
	Su>^2	0,0020	Su>^2	0,0012	Su>^2	0,0019
	F-stat	**1,2358**	**F-stat**	**2,4384**	**F-stat**	**1,8049**
	Degrees of freedom		Degrees of freedom		Degrees of freedom	
	V2	12	V1	12	V1	12
	V1	34	V2	34	V2	34
	Critical values:		Critical values:		Critical values:	
	0,99	3,701	0,99	2,843	0,99	2,843
	0,95	2,4663	0,95	2,0921	0,95	2,0921
Conclusion:	**Unequal sample size and equal variance**		**Unequal sample size and equal variance**		**Unequal sample size and equal variance**	
Negative Credit Watches: D/E < 1 vs D/E > 1	S (D/E<1)^2	0,0080	S (D/E<1)^2	0,0067	S (D/E<1)^2	0,0065
	S (D/E>1)^2	0,0084	S (D/E>1)^2	0,0011	S (D/E>1)^2	0,0033
	F-stat	**1,0498**	**F-stat**	**5,9608**	**F-stat**	**1,9473**
	Degrees of freedom:		Degrees of freedom		Degrees of freedom	
	V2	19	V1	24	V1	24
	V1	24	V2	19	V2	19
	Critical values:		Critical values:		Critical values:	
	0,99	2,47	0,99	2,386	0,99	2,386
	0,95	1,8842	0,95	1,8409	0,95	1,8409
Conclusion:	**Unequal sample size and equal variance**		**Unequal sample size and unequal variance**		**Unequal sample size and equal variance**	

Appendix 6.2.C. F-test of equal variances between high and low beta values.

F-test for equal variances	Pre announcement window t=-10 to t=-1		Inital window	t=0 to t=1	Short term window	t=0 to t=5
Downgrades: High vs low beta	Sd(high beta)^2	0,0107	Sd(high beta)^2	0,0476	Sd(high beta)^2	0,0649
	Sd(Low beta)^2	0,0452	Sd(Low beta)^2	0,0020	Sd(Low beta)^2	0,0062
	F-stat	**4,2255**	**F-stat**	**23,9335**	**F-stat**	**10,4100**
	Degrees of freedom		Degrees of freedom		Degrees of freedom	
	V1	30	V1	30	V1	30
	V2	30	V2	30	V2	30
	Critical values:		Critical values:		Critical values:	
	0,99	2,386	0,99	2,386	0,99	2,386
	0,95	1,8409	0,95	1,8409	0,95	1,8409
Conclusion:	**Equal sample size and unequal variance**		**Equal sample size and unequal variance**		**Equal sample size and unequal variance**	
Upgrades: High vs low beta	Sd(high beta)^2	0,0017	Sd(high beta)^2	0,0004	Sd(high beta)^2	0,0007
	Sd(Low beta)^2	0,0027	Sd(Low beta)^2	0,0006	Sd(Low beta)^2	0,0014
	F-stat	**1,5301**	**F-stat**	**1,3911**	**F-stat**	**2,1596**
	Degrees of freedom		Degrees of freedom		Degrees of freedom	
	V2	16	V2	16	V2	16
	V1	16	V1	16	V1	16
	Critical values:		Critical values:		Critical values:	
	0,99	3,409	0,99	3,409	0,99	3,409
	0,95	2,3522	0,95	2,3522	0,95	2,3522
Conclusion:	**Equal variance and sample size**		**Equal variance and sample size**		**Equal variance and sample size**	
Negative Credit Watch: High vs low beta	Sd(high beta)^2	0,0072	Sd(high beta)^2	0,0040	Sd(high beta)^2	0,0072
	Sd(Low beta)^2	0,0148	Sd(Low beta)^2	0,0070	Sd(Low beta)^2	0,0055
	F-stat	**2,0667**	**F-stat**	**1,7585**	**F-stat**	**1,2954**
	Degrees of freedom		Degrees of freedom		Degrees of freedom	
	V1	14	V1	14	V1	14
	V2	14	V2	14	V2	14
	Critical values:		Critical values:		Critical values:	
	0,99	3,656	0,99	3,656	0,99	3,656
	0,95	2,463	0,95	2,463	0,95	2,463
Conclusion:	**Equal variance and sample size**		**Equal variance and sample size**		**Equal variance and sample size**	

Appendix 6.2.D: Comparison of developing ACAR's between rating provided by Moody's and Standard & Poor's.

Figure 6.2.D1
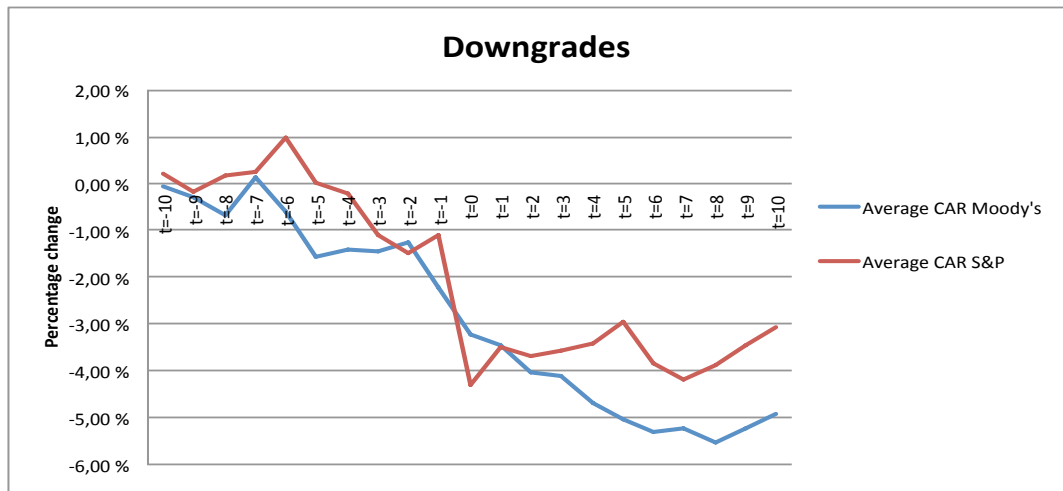
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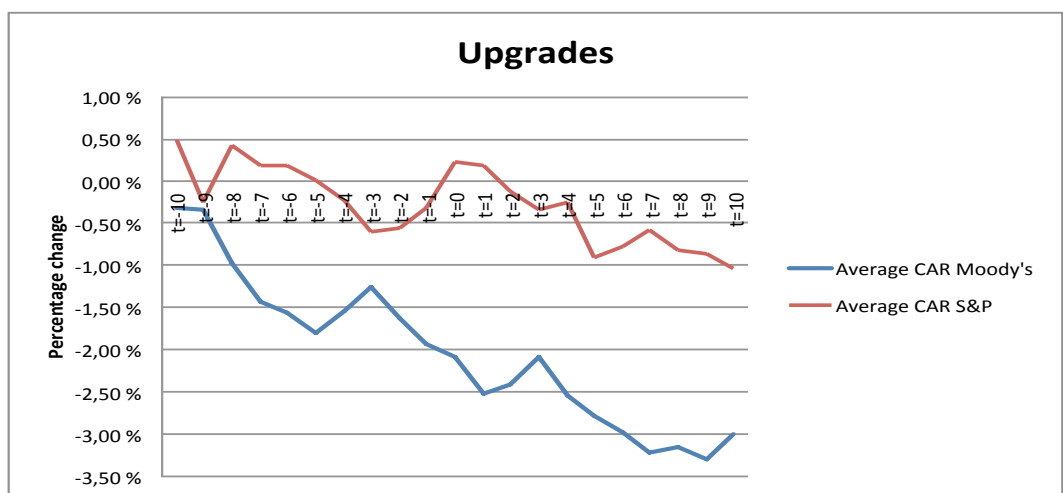
Figure 6.2.D3
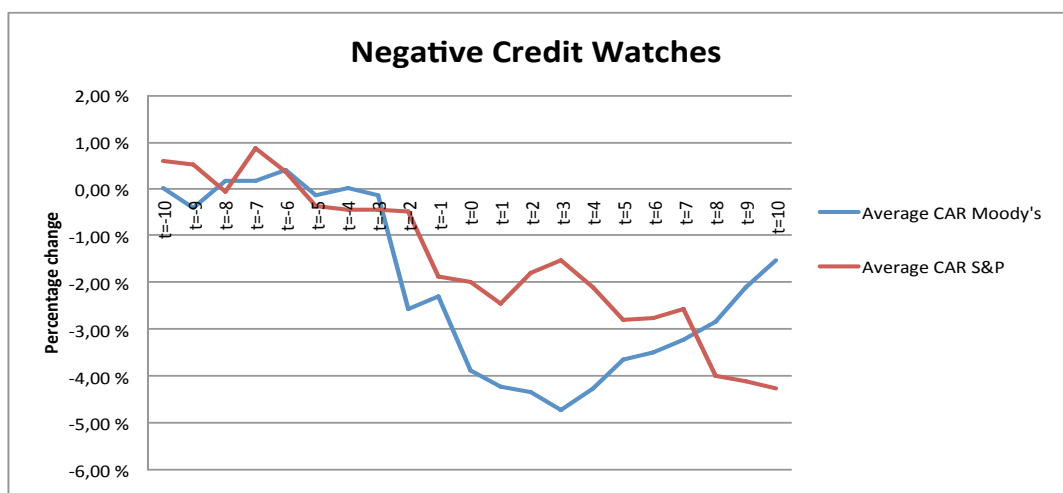
Appendix 6.2.E: Comparison of developing ACAR's between companies with high and low debt-to-equity ratio.
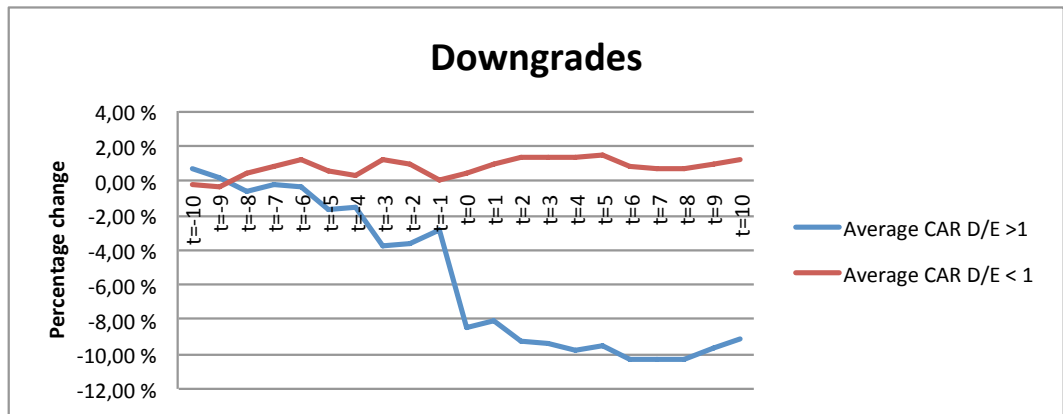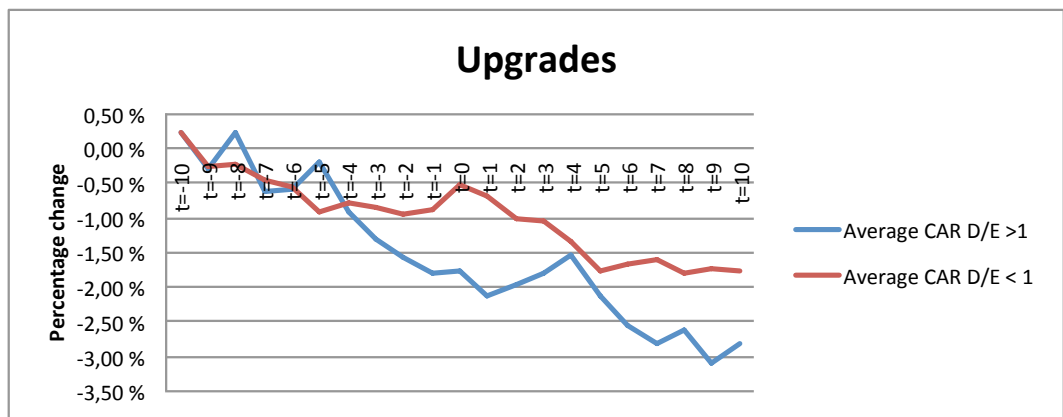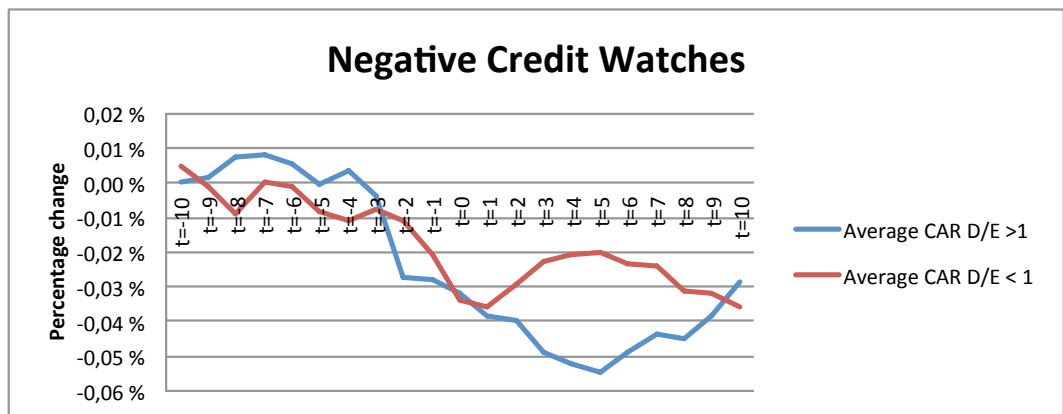
Figure 6.2.E1

Figure 6.2.E2

Figure 6.2.E3

Appendix 6.2.F: Comparison of developing ACAR's between companies with high and low beta values.
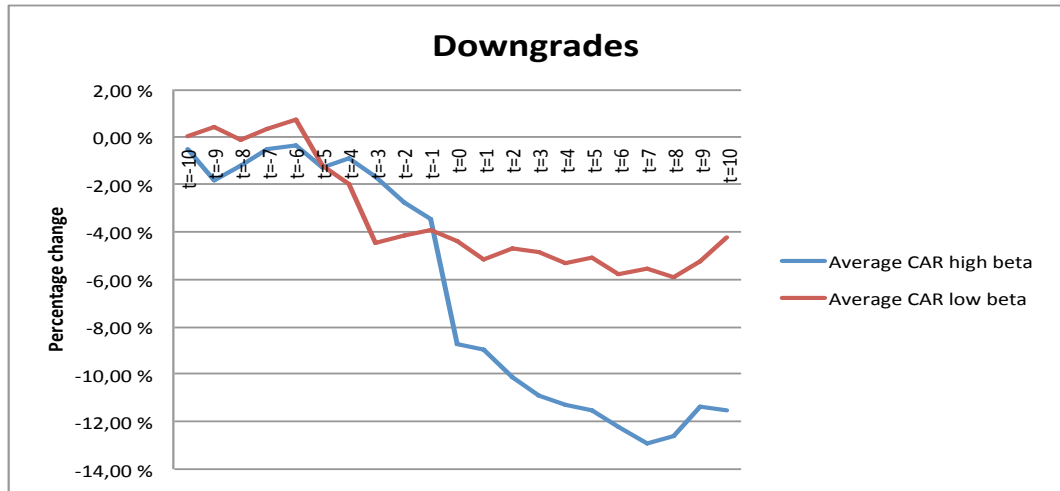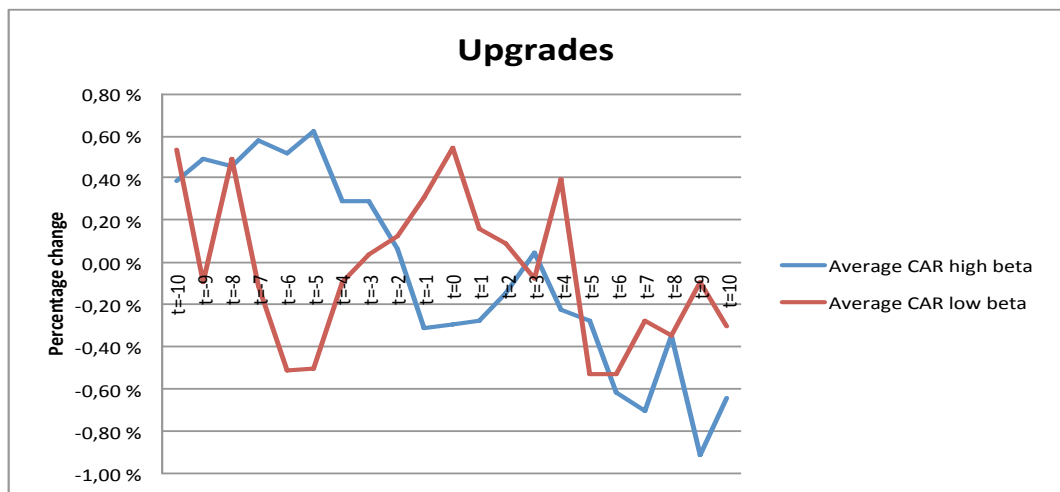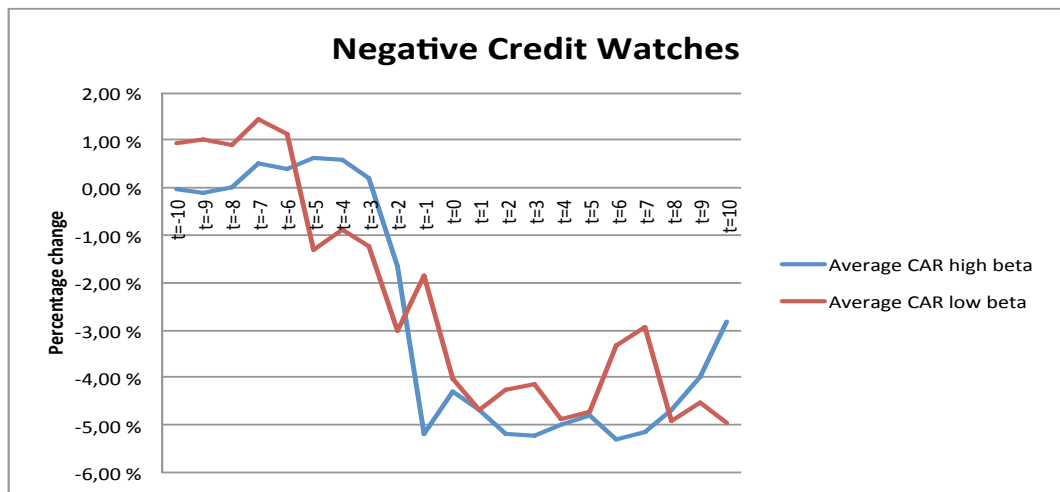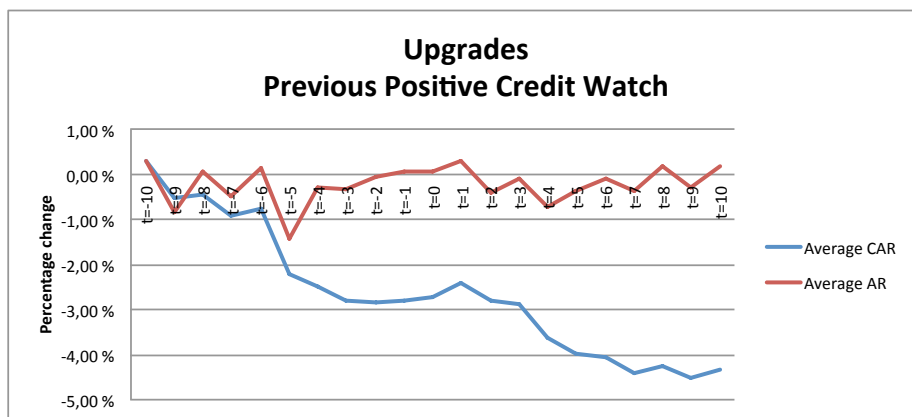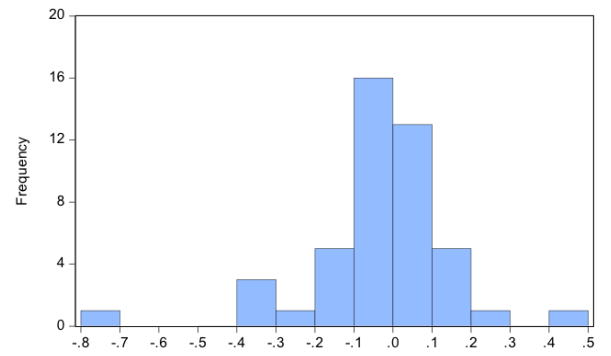
Figure 6.2.F1
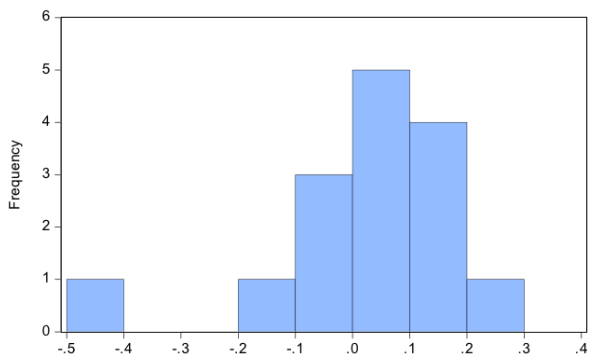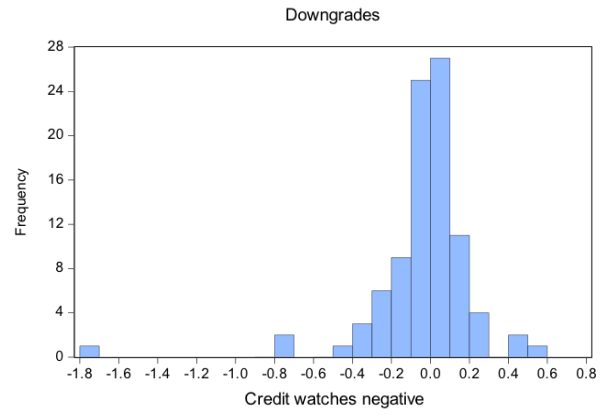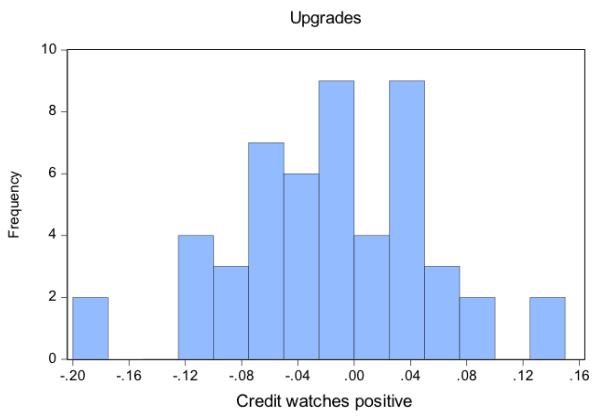

Figure 6.2.F2

Figure 6.2.F3

Appendix 6.3.1. Developing of ACAR surrounding a credit rating update.
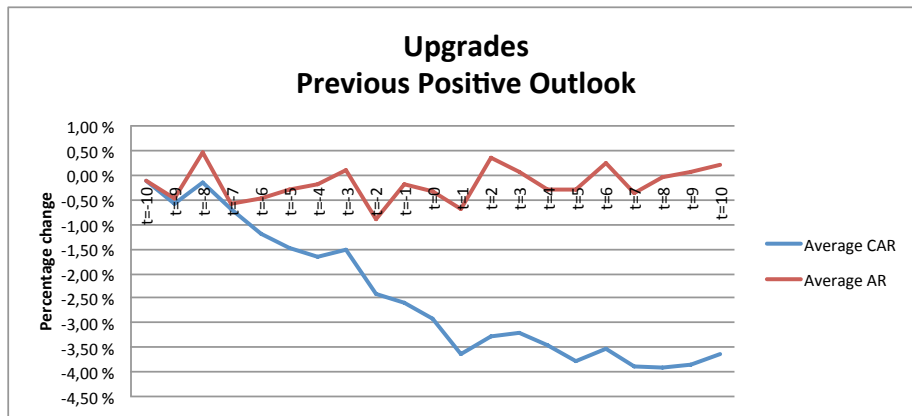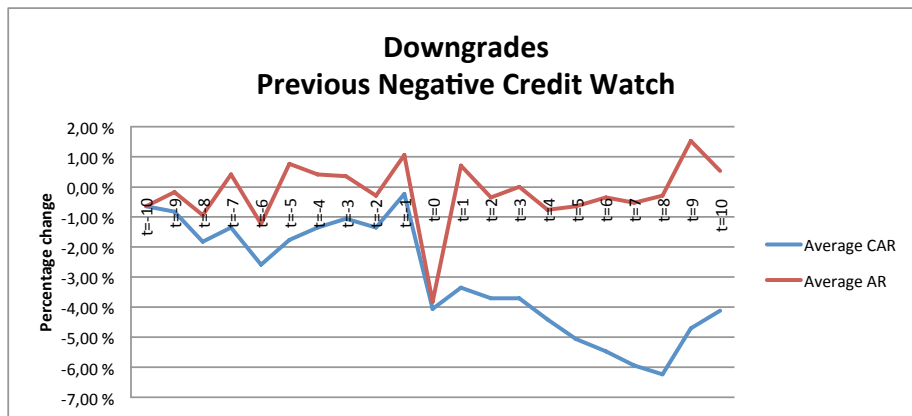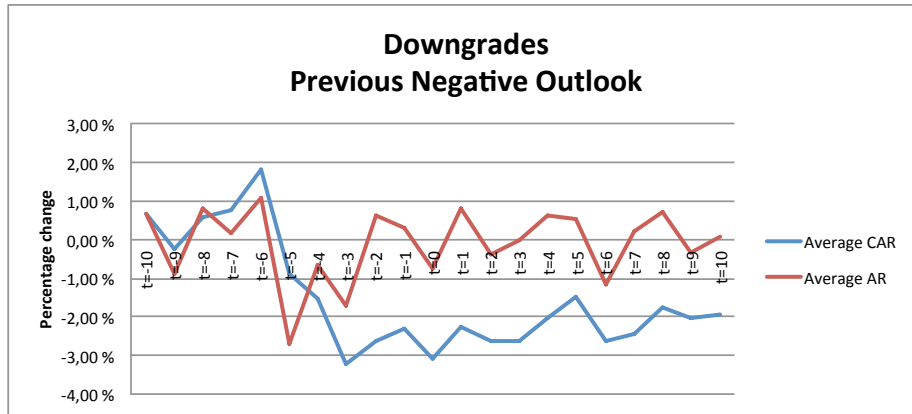
Appendix 7.1. Distribution of ACAR plots of initial event windows:
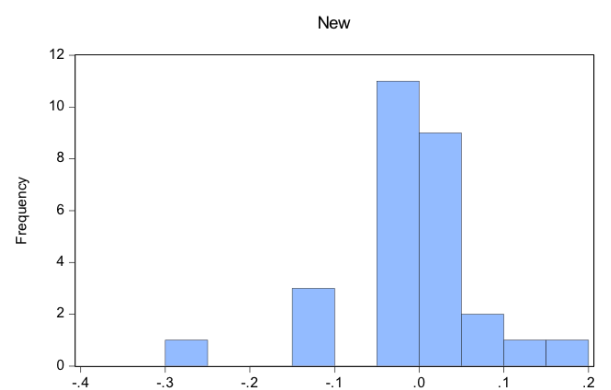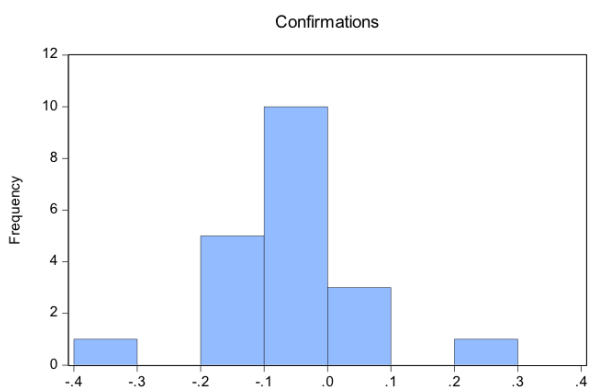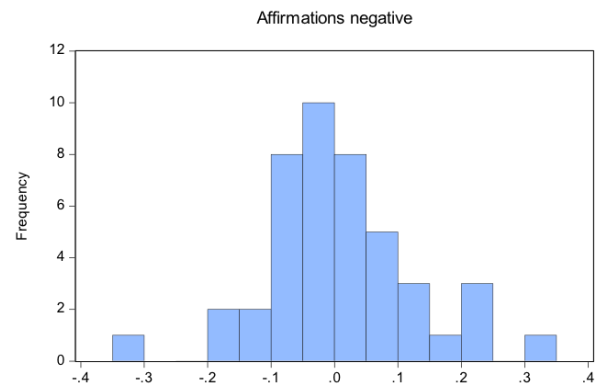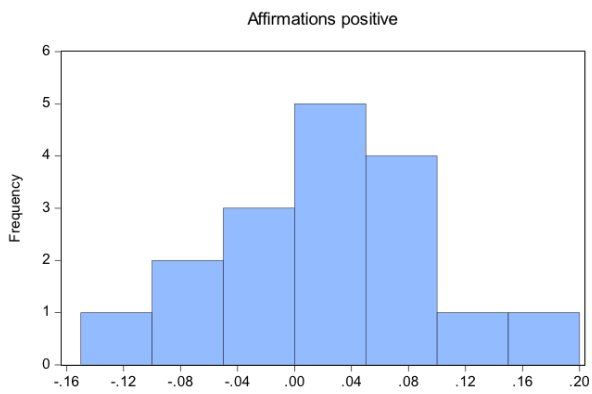
Appendix 7.2 Critical values for identifying outliers.

Table 7.2

	Downgrades	
Trading days	**Lower critical values**	**Upper critical values**
-10	*-0,1469*	*0,1682*
-9	*-0,2114*	*0,1238*
-8	*-0,1268*	*0,1836*
-7	*-0,0997*	*0,1556*
-6	*-0,1900*	*0,2055*
-5	*-0,1821*	*0,1552*
-4	*-0,1617*	*0,1283*
-3	*-0,1374*	*0,1818*
-2	*-0,1900*	*0,1996*
-1	*-0,1694*	*0,1730*
0	*-0,3637*	*0,1486*
1	*-0,2007*	*0,1974*
2	*-0,1845*	*0,1485*
3	*-0,1380*	*0,1809*
4	*-0,1971*	*0,0988*
5	*-0,1902*	*0,1506*
6	*-0,2044*	*0,0961*
7	*-0,1170*	*0,1148*
8	*-0,1261*	*0,1307*
9	*-0,1603*	*0,1642*
10	*-0,1597*	*0,1725*

Appendix 7.3. Detected contaminating news in our Downgrade sample.

Table 7.3

Company	Announcement date	Reason for exclution	Day in event window
Petroleum Geo Services	31. juli 2002	Termination of merger plan bewteen Veritas DGC Inc. and Petroleum Geo Services	t=0 and t= 2
TDC	11. april 2006	New highly leveraged capital structure following its LBO.	t= -5
TDC	13. april 2006	New highly leveraged capital structure following its LBO.	t= -3
SAS	22. juli 2008	Jump in share price due to falling oil price.	t=1

Appendix 7.4.A F-test of equal variances between Moody's and S&P, after elimination of contaminating news.

Table 7.4.A

F-test for equal variances	Pre announcement window	t=-10 to t=-1	Inital window	t=0 to t=1	Short term window	t=0 to t=5
Downgrades: Moody's vs S&P	Sd(Moody's)^2	0,0096	Sd(Moody's)^2	0,0033	Sd(Moody's)^2	0,0131
	Sd(S&P)^2	0,0133	Sd(S&P)^2	0,0046	Sd(S&P)^2	0,0062
	F-stat	**1,3858**	**F-stat**	**1,3661**	**F-stat**	**2,1077**
	Degrees of freedom		Degrees of freedom		Degrees of freedom	
	V1	35	V1	55	V1	55
	V2	55	V2	35	V2	35
	Critical values:		Critical values:		Critical values:	
	0,99	1,836	0,99	1,936	0,99	1,936
	0,95	1,5343	0,95	1,5943	0,95	1,5943
Conclusion:	Unequal sample size and equal variance		Unequal sample size and equal variance		Unequal sample size and unequal variance	

Appendix 7.4.B F-test of equal variances between high and low debt to equity, after elimination of contaminating news.

Table 7.4.B

F-test for equal variances	Pre announcement window	t=-10 to t=-1	Inital window	t=0 to t=1	Short term window	t=0 to t=5
Downgrades: D/E < 1 vs D/E > 1	S (D/E<1)^2	0,0096	S (D/E<1)^2	0,0016	S (D/E<1)^2	0,0044
	S (D/E>1)^2	0,0142	S (D/E>1)^2	0,0063	S (D/E>1)^2	0,0131
	F-stat	**1,4831**	**F-stat**	**3,8553**	**F-stat**	**2,9800**
	Degrees of freedom		Degrees of freedom		Degrees of freedom	
	V2	49	V2	49	V2	49
	V1	41	V1	41	V1	41
	Critical values:		Critical values:		Critical values:	
	0,99	2,114	0,99	2,114	0,99	2,114
	0,95	1,6928	0,95	1,6928	0,95	1,6928
Conclusion:	Unequal sample size and equal variance		Unequal sample size and unequal variance		Unequal sample size and unequal variance	

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